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Western Mining in the Twentieth Century Series

THE KNOXVILLE MINING DISTRICT, THE McLAUGHLIN GOLD MINE, NORTHERN CALIFORNIA, 1978-1995

Volume I

James Anderson	HOMESTAKE VICE PRESIDENT-EXPLORATION
Will Baker	CITIZEN ACTIVIST
Norman Birdsey	METALLURGICAL TECHNICIAN
Brice Bledsoe	DIRECTOR, SOLANO IRRIGATION DISTRICT

With an Introduction by
Duane A. Smith

Interviews conducted by
Eleanor Swent
in 1994 and 1995

Since 1954 the Regional Oral History Office has been interviewing leading participants in or well-placed witnesses to major events in the development of Northern California, the West, and the Nation. Oral history is a method of collecting historical information through tape-recorded interviews between a narrator with firsthand knowledge of historically significant events and a well-informed interviewer, with the goal of preserving substantive additions to the historical record. The tape recording is transcribed, lightly edited for continuity and clarity, and reviewed by the interviewee. The corrected manuscript is indexed, bound with photographs and illustrative materials, and placed in The Bancroft Library at the University of California, Berkeley, and in other research collections for scholarly use. Because it is primary material, oral history is not intended to present the final, verified, or complete narrative of events. It is a spoken account, offered by the interviewee in response to questioning, and as such it is reflective, partisan, deeply involved, and irreplaceable.

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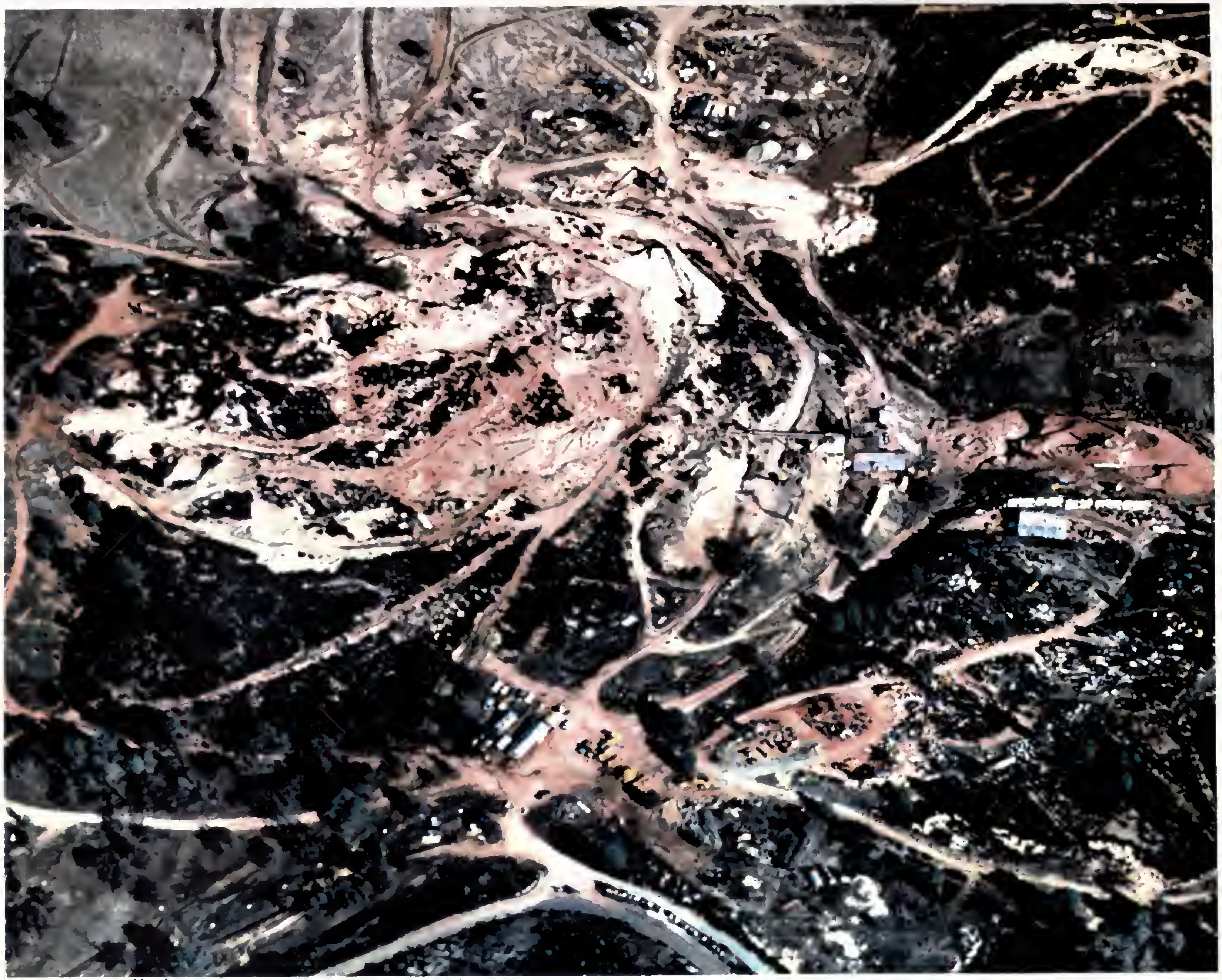

Manhattan mercury mine site at the time of the McLaughlin gold discovery, 1979: Gail Ridge sinter, upper left quadrant; One Shot furnace, center right; calcines, far right center. Roads and pits are from a century of mercury mining.

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James Anderson (b. 1935), geologist: Kennecott Copper Co., 1960-1967; Occidental Minerals, 1967-1975; Armand Hammer, Gore family; vice president, exploration, Homestake Mining Co., 1975-1987, researching mercury hot springs, gold discovery at Manhattan [renamed McLaughlin] Mine; environmental aspects, community relations; member, chairman, California State Mining and Geology Board; CEO, Minven, 1987-1995. Will Baker (b. 1935), professor of English, UC Davis: Capay Valley, CA, community activism; opposing Davis Creek Dam, efforts to block approval of environmental impact report, concerns about air and water pollution. Norman Birdsey (b. 1957), metallurgical technician: U.S. Navy, boatswain's mate, 1975-1979, 1981-1984; Homestake Mining Co., 1979-1981, Bulldog Mine, CO, mill operator; 1981-1995, McLaughlin Mine, startup training, autoclave operator, process specialist. Brice Bledsoe (b. 1927), director, Solano Irrigation District: formation of Solano County Flood Control and Water Conservation District; McLaughlin Mine, SID demands satisfied for fail-safe containment of tailings, regulation of cyanide transport, daily monitoring, future oversight.

Introduction by Duane Smith, Professor of History and Southwest Studies, Ft. Lewis College, Durango, CO.

Interviews conducted by Eleanor Swent in 1994 and 1995 for the Western Mining in the Twentieth Century oral history series.

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THE WESTERN MINING IN THE TWENTIETH CENTURY ORAL HISTORY SERIES
1993-1997

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Individuals
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PROJECT HISTORY--Knoxville District/McLaughlin Mine Oral History Project

The development of the McLaughlin gold mine in the Knoxville District of Napa, Lake, and Yolo Counties in California in the last quarter of the twentieth century was a historically significant event. The mines of the district had been major producers of mercury since 1861. In 1888 an official report by G. F. Becker on the quicksilver deposits mentioned the presence of free gold which could be obtained by panning. It took almost a century before this knowledge could be acted upon when Homestake Mining Company signed an agreement with James William Wilder, owner of the Manhattan Mine, in 1978.

Advisors to the oral history series on Western Mining in the Twentieth Century[1] who were also Homestake directors, Professor Douglas Fuerstenau, principal faculty advisor, Clifford Heimbucher, and John Kiely, all urged the Knoxville/McLaughlin oral history project, as did advisor Sylvia McLaughlin, widow of the Homestake chairman for whom the mine was named. It was decided it should be a community oral history, in contrast to the previous volumes in the series which documented individual careers.

The five historically important aspects are: the history of the Knoxville mercury mining district, with its periodic booms and busts; the effects of a large industrial development and influx of technically trained workers in an economically depressed rural area; the efforts to obtain permits to develop a mine near a center of environmental activism; the continuous pressure oxidation system which was pioneered at the McLaughlin processing plant; the reclamation of the mine site. The life of the McLaughlin mine was projected to be about twenty years, and most of the key players were available for interviews. It is a nearly unique opportunity to document the discovery, development, and closing down of a mine while it is happening.

The chronology of the McLaughlin Mine is as follows: in 1961, following publication of a Professional Paper by USGS geologist Ralph J. Roberts, Newmont geologists John S. Livermore and J. Alan Coope found a major deposit of micron-sized gold on the Carlin trend in Nevada. It was economic to mine because of technological advances in explosives and earth-moving equipment, and development of new methods such as heap-leaching for recovery of gold from ore. This led other mining companies to search for similar deposits of "invisible" gold.

In 1969, the National Environmental Protection Act was passed, followed in 1970 by the California Environmental Quality Act.

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[1]Information on the Western Mining in the Twentieth Century oral history series appears in Appendix F, page 298.

In the 1970s, "Bill" Wilder, principal of the One Shot Mining Company, was reclaiming batteries for Mallory Company in the furnaces at the Manhattan mercury mine. Environmental concerns had made mercury mining unprofitable, so Wilder was crushing the beautiful colored rock on his property and selling it as decorative stone. An assay from several years before had showed gold was there, but at that time mercury at $75 a flask was more valuable than gold at $35 an ounce, the official price from January 1934, when the United States went off the gold standard, until 15 March 1968.

In August 1971, President Richard Nixon terminated the convertibility of the dollar into gold, and the price climbed to $700 an ounce in 1980. In 1977, Homestake Mining Company underwent a restructuring and embarked on a program to find a world-class gold mine. Their search revealed geology reports in their files from the 1920s which encouraged exploration at hot springs near the Knoxville mercury mining district of northern California. In 1978 Donald Gustafson, Homestake geologist, visited the Manhattan Mine at the place where Napa, Yolo, and Lake Counties meet.

The history of the Knoxville District begins in 1861 with the incorporation of the Redington quicksilver mine, also known as the XLCR or Knoxville mine, then employing as many as 300 men. The town of Knoxville had thirty or more buildings, including a store, hotel, postoffice, Wells Fargo office, school, and cemetery. In 1872 the state legislature transferred prosperous Knoxville Township from Lake County to Napa County, although it is separated from the Napa Valley by mountain escarpments. Lake County was compensated with a one-time payment of $3500.

In 1869 R. F. Knox and Joseph Osborn opened the Manhattan Mine on the same lode as the Redington. The Oat Hill or Napa Consolidated Mine was opened in 1872. A report on the metallurgy of quicksilver issued by the Department of the Interior in 1925 says, "In 1874, the Knox continuous shaft-furnace for the treatment of both fine and coarse ores was first used in California." [Bulletin 222, p.5] The Knox-Osborn design was further augmented by a fine-ore natural-draft furnace developed by mine superintendent Charles Livermore. The district prospered until 1905, for a decade around World War I, and from 1927-1936. Demand for mercury rose during wartime because it was used as a detonator for explosives.

Knoxville was linked by road through Sulphur Canyon with the town of Monticello in fertile Berryessa Valley. Farmers descended from early Scots settlers grew pears, prunes, wheat, and barley and occasionally worked in the mercury mines. After World War II, when California's population was growing rapidly, a dam was built which by 1956 flooded the valley to create Lake Berryessa. It attracted vacationers, and for most of them it was the end of the line. The unpaved road from Lake Berryessa

to Knoxville was impassable when rains filled the creek bed. In the other direction, from Knoxville to Clearlake, there was a similar little-used road through Morgan Valley.

Although it is only a few miles from the densely populated San Francisco Bay Area, in 1978 Knoxville township had few telephones, surfaced roads, or bridges. Populated by ranchers, miners, seasonal hunters, and outlaws, it was one of the most economically depressed regions in California, with high unemployment. In 1991, Napa historian Robert McKenzie called it "truly the last frontier of Napa County."

Mining companies are familiar with developing mines in remote and rugged locations, with the attendant logistical problems. In this case, there was the further challenge of obtaining permits to develop a mine in the jurisdiction of three counties, regional and state water quality districts, three regional air quality districts, various state agencies, and the Bureau of Land Management. It took more than five years and cost millions of dollars to secure the 327 required permits which made a stack of paper more than eight feet high. In addition, the ore itself was finely disseminated, fairly low grade, and as it turned out, highly refractory. Traditional methods of beneficiation were ruled out by environmental concerns, so Homestake metallurgists developed a high pressure oxidation system, incorporating technology from South Africa, Germany, Canada, and Finland, which has now been widely copied.

The eventual design was for a mine pit with adjacent crushing plant and a five-mile pipeline to conduct slurry to a zero-discharge processing plant using a variety of technologies, including autoclaves. Reclamation in the mine and on dumps began almost immediately, and at the end of the mine's life, it was to be a part of the Nature Reserve system of the University of California, for research by scholars at both the Berkeley and Davis campuses.

In 1991, the Regional Oral History Office began to explore possibilities for funding the Knoxville/McLaughlin oral history. A four-year project was outlined to include about thirty-five interviews averaging three hours each, for a total cost of $100,000. The initial plan was to schedule and begin interviews with key Homestake and community personnel in the first year, and to transcribe and edit these interviews concurrently with continuing interviews through the second and third years. The fourth year would be devoted to the final editing tasks. The product would be a set of three volumes covering the mercury mining, the gold mining, and the resulting changes in the surrounding community.

The Hearst Foundation granted $20,000 to document the gold mine, and the Mining and Metallurgical Society of America gave $6,000 to document the earlier mercury mining. Homestake and Chemical Lime Company each donated $2,000, which enabled interviewing to begin in March, 1993. As

the project went on, other organizations and individuals joined in the funding effort. They are all listed on the donor page.

The best laid plans, however, can be spoiled by circumstances beyond control. One of the first names on the list of interviewees was John Ransone, Homestake's construction project director. He sent helpful background documents in preparation for a scheduled interview; however, before it could be held he died of lung cancer. The project manager for the construction company, Klaus Thiel, in the meantime had been assigned to work in Brisbane, Australia, so he could not be interviewed. Several of the other Homestake people had scattered: James Anderson to Denver, Jack Thompson and John Turney to British Columbia, David Crouch to Salt Lake City, Donald Gustafson to jobs in Namibia and Kazakhstan, Joseph Strapko to Maine. William Humphrey and Richard Stoehr both underwent major surgery.

Similar problems occurred on the list of community leaders. Some died and others moved away. All of this led to a revised plan to use the available funding to press ahead with recording all the interviews, and to leave the processing of the tapes for later.

There is a perception that the former mercury miners are all dead, killed by mercury poisoning. In fact, Dean Enderlin, a geologist at the McLaughlin Mine and also a Napa County native and historian, helped to locate some who were remarkably healthy, and who were interviewed. Elmer Enderlin in his eighties spends summers working at his tungsten prospect in Idaho and winters in Lower Lake. Anthony Cerar, also in his eighties, actively maintains several historic mercury mines, including La Joya and Corona. William Kritikos, operator of the Oat Hill Mine, was nearly seventy-three when he died following a stroke, but was in good health at the time of his interview. Ed McGinnis, who worked around the Reed Mine as a boy, is still active in his seventies. Bill Wilder, who owned the Manhattan Mine, is a relative youngster in his seventies and in good health in Upper Lake.

By 1998 a number of members of the local communities had been interviewed: a county supervisor from each of the three counties involved, Napa County planners, the Lake County school superintendent, community historians and pioneers, merchants, and ranchers. Some of the most vocal opponents of the mine were also interviewed. Interviews were conducted with many of the Homestake officials and employees involved in key roles in the discovery and development of the mine. The project comprises forty-three interviews in all.

Two of the interviews were completed in 1996: William Humphrey, who was Homestake's executive vice president of operations in charge of the mine development, and William Wilder, owner of the Manhattan Mine. The oral history of Langan Swent completed in 1995 also contains relevant information.

We are grateful to all of the interviewees for their participation. There are many others who have helped also. Homestake Mining Company has cooperated with the project, lending the Regional Oral History Office a computer and printer, and making available for research the archival video tapes and files of newspaper clippings and news releases, as well as the environmental studies, the environmental impact report, and the environmental impact statement. Early on, a day tour of the property and box lunch were provided for a van load of ROHO staff, interested students, and faculty from the University of California at Berkeley. The conference room at the mine and the San Francisco offices at 650 California Street have been used for interviewing.

James Jensen made available his extensive files on mercury mining and processing and mercury poisoning. Anthony Cerar led a vigorous hike around the Knoxville mine site, identifying foundations of long-gone buildings and workings. John Livermore conducted a tour by jeep of the Knoxville district, and suggested the importance of the Morgan North papers at The Bancroft Library. Staff members gave help at the Napa Register, the Napa Museum, and the Sharpsteen Museum in Calistoga. At the Lake County Museums in Lower Lake and Lakeport, Donna Howard and Linda Lake were particularly helpful. Ron Churchill, Ralph Loyd, Kathleen Twomey, and Les Youngs provided useful data from files of the California Department of Conservation Division of Mines and Geology.

The Regional Oral History Office was established in 1954 to augment through tape-recorded memoirs the Library's materials on the history of California and the West. Copies of all interviews are available for research use in The Bancroft Library and in the UCLA Department of Special Collections. The office is under the direction of Willa K. Baum, Division Head, and the administrative direction of Charles B. Faulhaber, James D. Hart Director of The Bancroft Library, University of California, Berkeley.

Eleanor Swent, Project Director
Knoxville District/McLaughlin Mine
Oral History Project

January 1998
Regional Oral History Office
The Bancroft Library
University of California, Berkeley

INTRODUCTION TO KNOXVILLE by Duane A. Smith

Imagine, if you would, what it would be like to have a series of interviews from people of all walks of life from a nineteenth century mining town and district--for example, a Fiddletown, California; a Silver City, Idaho; or a Caribou, Colorado. Would it not be exciting to "hear" first hand the stories of miners, store owners, lawyers, teachers, and a variety of other folks that make up the mining West?

Such a series of interviews would be the perfect answer to the Roman statesman, orator, and philosopher, Marcus Tullius Cicero, who observed more than 2,000 years ago: "History is the witness that testifies to the passing of time; it illuminates reality, vitalizes memory, provides guidance in daily life, and brings us tidings of antiquity." Imagine, then, what the Knoxville/McLaughlin oral history project is going to mean to future generations.

The Knoxville, California, mining district has a long mining history. It started in the 1860s with mercury mining and continued into the 1990s with Homestake Mining Company's McLaughlin gold mine. Under the guidance of Eleanor Swent, and as part of the Regional Oral History Office's Western Mining in the Twentieth Century series, a comprehensive oral history project of this mining district was launched in 1993. These fascinating and significant volumes are the finished projects.

While obviously impossible to go back beyond the turn of the century, interviews were conducted with miners, ranchers, journalists, teachers, and merchants who were in the district before the arrival of Homestake. The words of these people provide an exciting look at a district in transition and decline. Then came Homestake and their world changed.

Some gold mines had been operated here in the nineteenth and twentieth centuries, but they were nothing like what occurred when a major mining company became interested. Homestake's geologists found enough gold to warrant development. The concept would be an open pit mine and mill that would impact Napa, Lake, and Yolo Counties in northern California for a generation and provide for the future.

Five and one-half years went into planning for the McLaughlin gold mine, including 327 approvals needed for the mine's development. Not only were some mining ideas new and ground breaking, but the operation was sitting in one of the most environmentally aware states in the country. Homestake spent over $283 million in start-up costs, before mining commenced in March 1985. The first year's production of 83,836 ounces of gold showed that the planning and work had been worthwhile from a dollars-and-cents aspect. Homestake was proud of its operation.

"The McLaughlin mine is the site of the first successful commercial application of the autoclave processing technology for extracting gold from ores. The operation began production in 1985 and is a showcase for environmental responsibility."

Homestake would continue to mine the pit into 1996 when mining ceased, except for processing previously stockpiled lower-grade ore to be worked for approximately another eight years, "using a conventional direct cyanide leach process." Reclamation, which has been conducted simultaneously with mining, would also continue into the next century. As Homestake's annual report in 1995 stated, "Reclamation of mine waste dumps is scheduled for completion in the latter part of 1996 with the final placement of top soil and hydroseeding. The planting of oak trees and other indigenous vegetation will continue seasonally until the area is completely reclaimed."

All this makes the oral history project that much more exciting; it was conducted while the district still operated and memories were fresh and riveted on a host of topics and concerns. This multi-volume series covers almost every conceivable aspect and impact--it is a monument to a refreshing, innovative way of approaching mining history.

These volumes provide a case study of twentieth century mining, environmental issues, and regional concerns, the successes, failures, tensions, and developments that go to make up a 1980s and 1990s mining operation and the people involved from all walks of life. They are a gold mine of primary documentation and personal memories of an era that is passing into history. A perusal of the table of contents will give the reader an idea, but the interviews need to be "assayed" carefully to grasp the whole story of what went on at the McLaughlin mine and why its impact was so significant. This is a "high grade" effort all the way.

Cicero would be proud. These volumes do illuminate reality, vitalize memory, and provide guidance in daily life. Without question, they testify to the passing of time and will eventually bring "us the tidings of antiquity."

Duane A. Smith
Professor of History and
Southwest Studies

September 1997
Fort Lewis College
Durango, Colorado

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University of California
Berkeley, California

Western Mining in the Twentieth Century Series
Knoxville/McLaughlin Project

James Anderson

HOMESTAKE VICE PRESIDENT-EXPLORATION

Interview conducted by
Eleanor Swent
in 1995

James Anderson, 1974.

INTERVIEW WITH JAMES ANDERSON

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INTERVIEW HISTORY--James Anderson

James Anderson was vice president of exploration for Homestake Mining Company in 1975 when gold was discovered at the Manhattan Mine in Napa County, California. His name was obviously one of the first on the list of interviewees for the oral history of the McLaughlin Mine (as it was later called), but it was some time before we could arrange an interview because Anderson had left Homestake and moved to Colorado to pursue independent mining interests. In September 1995 I was in Denver to present the oral history of Simon Strauss at the annual banquet of the National Mining Hall of Fame, and Jim's travels were curtailed because of the failing health of his father, who made his home with Jim and his wife Ann in Englewood. We took advantage of the opportunity to hold the interview in the afternoon of 23 September 1995 at my hotel in downtown Denver.

Jim is tall and fit; his glasses give him a scholarly appearance. He has an enthusiastic and optimistic disposition. Exploration geologists are almost by definition chary of giving out information, and Jim is additionally known for his careful attention to detail. He appeared cautious at first about the interview, but once we began, he was forthcoming as he recalled his career as exploration geologist for Kennecott and vice president of exploration for Occidental Minerals before joining Homestake in 1975 and becoming a member of the California State Mining and Geology Board in 1977. In the interview he recounts with evident pleasure his work in classifying the gold deposits of the world and doing the research on mercury hot springs which culminated in the McLaughlin discovery. He discusses in some detail the discovery itself, the efforts to obtain rights to surrounding property, determining the feasibility of the mine, and directing the development of the project until it was turned over to operation several years later. He left Homestake in 1987 to found his own company, Minven, working out of Denver, although he continued to serve as chairman of the California State Mining and Geology Board until 1992.

The tapes of the interview were transcribed in the Regional Oral History Office, lightly edited, and sent to Anderson in April 1997 for review. He reviewed the transcript carefully, making a small number of changes to correct and/or clarify details, and returning it promptly. The manuscript was corrected and indexed at our office. The tapes are deposited in The Bancroft Library and are available for study.

The James Anderson interview is one of more than forty interviews which were conducted by the Regional Oral History Office from 1993-1997 in order to document the development of the McLaughlin gold mine in the Knoxville District of Lake, Napa, and Yolo Counties, California, from 1978-1997, as part of the ongoing oral history series devoted to Western Mining in the Twentieth Century. The Regional Oral History Office was established in 1954 to record the lives of persons who have contributed significantly to the history of California and the West. The office is a division of The Bancroft Library and is under the direction of Willa K. Baum.

Eleanor Swent, Project Director, Research Interviewer/Editor
September 1997

Regional Oral History Office
Room 486 The Bancroft Library

University of California
Berkeley, California 94720

BIOGRAPHICAL INFORMATION

(Please write clearly. Use black ink.)

Your full name JAMES ARTHUR ANDERSON

Date of birth MARCH 25, 1935 Birthplace AURELIA, IOWA

Father's full name VERNON L. ANDERSON

Occupation INDEPENDENT BUSINESS MAN - AMOCO DISTRIBUTOR Birthplace GALVA, IOWA

Mother's full name AGNES W. ANDERSON

Occupation SCHOOL TEACHER Birthplace CHEROKEE, IOWA

Your spouse ANN S. ANDERSON

Occupation HOMEMAKER Birthplace EUREKA, UTAH

Your children NONE

Where did you grow up? GALVA, IOWA (TO AGE 8); EUREKA, UTAH

Present community ENGLEWOOD, COLORADO

Education

University of Utah	BS	1957	Geological Engineering
Harvard University	MA	1960	Mining Geology
Harvard University	Ph.D.	1965	Economic Geology
Stanford University	Certificate of Completion	1978	Executive (MBA) Progr

Occupation(s)
SENIOR MINING INDUSTRY EXECUTIVE: CHAIRMAN (BLACKDOME MINING CO, STATE OF CA MINING & GEOLOGY BOARD); PRESIDENT (MINVEN GOLD CORP, OLYMPIC MINING CO); EXECUTIV V.P AND DIRECTOR (HOMESTAKE MINING CO, FULCRUM MANAGEMENT, VENTURES TRIDENT); VICE

Areas of expertise PRESIDENT - US EXPLORATION (OCCIDENTAL MINERALS CORP); EXPLORATION GEOLO (KENNECOTT CORP). WORLDWIDE;

Exploration, research and development, economic and pre-feasibility studies, land acquisition, company start-up situations encompassing acquisitions and mergers. Broad based background includes international financing strategies, accounting and finance, marketing, operations, government affairs, environmental permitting, securities regulations, investor relations, negotiating, human resources management, AND PUBLIC POLICY. Skilled communicator with heavy exposure to making key presentations to board of directors and financial institutions.

Other interests or activities PUBLIC POLICY CONCERNING: MINERAL RESOURCE DEVELOPMENT, ENVIRONMENTAL MANAGEMENT AND GEOLOGIC HAZARDS.
SPORTS: TENNIS, HAND BALL, HIKING

Organizations in which you are active - SOCIETY OF ECONOMIC GEOLOGISTS,
- CORONADO ASSOCIATES (INVESTMENT MANAGEMENT) - OWNER & PRESIDENT

I EARLY YEARS, 1935-1965

[Date of Interview: September 23, 1995] ##[1]

Growing up in Eureka, Utah, a Silver-Lead-Zinc-Mining Town

Swent: This is Eleanor Swent interviewing James Anderson in Denver, Colorado, on September 23, 1995.

Let's just start with you in Iowa. You were born, you said, in Aurelia, Iowa, in 1935. Tell about your mother and your father, if you don't mind.

Anderson: We were farmers, and my father joined the navy in 1941. My mother was a schoolteacher in Iowa, as well as running the farm while he was away in the war. She came to Greeley, Colorado, and got a degree in elementary education there. Then she and I moved to Eureka, Utah, which is a mining town--that was in 1942. My father was in the navy until 1945, and when he was discharged we stayed in Utah. My girlfriend's father was a mine manager at one of the mines in this little mining town, and I got a further interest in mining from that; that's how I got started in mining.

Swent: Were most of your friends in school connected with the mining in one way or another?

Anderson: Yes, I'd say probably 50 or 60 percent of the residents were involved somehow with mining activities.

Swent: What were the mines there?

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[1]## This symbol indicates that a tape or tape segment has begun or ended. A guide to the tapes follows the transcripts.

Anderson: They were primarily silver-lead-zinc mines. There was one called Chief Consolidated Mine, which was probably the biggest one at the time.

Swent: Was that part of a larger company?

Anderson: No, it was a separately listed company on the Salt Lake City Stock Exchange, called Chief Consolidated. And then there were three or four other mines--one was called Tintic Standard--and all these companies were just listed on the Salt Lake Exchange, so they were small. I'm not sure whether they were listed on any bigger exchange or not. Tintic Standard, and the North Lily Mining Company, and the Eureka Standard Mining Company were the main producers at the time.

Swent: Lily, I think, is where the mucking machine was developed.

Anderson: That's correct.

Swent: Were you aware of that?

Anderson: No, not at the time.

Swent: Did you visit any mines?

Anderson: After I got out of high school I went to the University of Utah, and during my summers I would work in the mines or with surveying crews or whatever exploration was in the area. So I didn't spend a lot of time in the mines there in Tintic until I graduated.

Swent: And these are silver and--

Anderson: Silver-lead-zinc mines. Silver and lead were the main products.

Swent: No gold?

Anderson: Minor gold. North Lily was actually a gold mine, but that gold ore zone was mined out by the time I moved to Eureka. It also had lead-zinc-silver ore deposits. It was a very rich gold mine in its day.

Swent: Did the schools tie in with the mining at all? Was there an emphasis in--

Anderson: Not particularly, except they had a program for schoolteachers that some of the students could attend which was an evening course in geology and rocks and minerals and sort of a history

of the earth. So you got some flavor. It was taught by one of the exploration managers for the E. J. Longyear company, and he just did that on a volunteer basis. There were no course credits or anything, but it was just community interest. He really inspired a lot of enthusiasm for me in terms of how the earth was formed, what minerals were, and how they were recovered.

Swent: You enjoyed that?

Anderson: Yes.

Swent: Who was the person who taught it?

Anderson: His name was Gephardt.

Swent: He was not a schoolteacher.

Anderson: No. He was a full-time employee of the E. J. Longyear company, which in those days was an exploration and diamond-drilling company. They had a lot of drilling contracts in the Tintic Mining District.

Swent: Did many of the boys from your class go on into mining or geology?

Anderson: To my knowledge only one other one, and more as a prospector rather than a professional in the business. The graduating classes were twenty-four to thirty people when I graduated in 1952.

Swent: Small town. You graduated from high school in '52?

Anderson: Yes.

Ann Sutherland

Swent: And Ann was in the same high school?

Anderson: She was in the same high school, one year behind me.

Swent: And what was her name?

Anderson: Her name was Sutherland.

Swent: And then did you both go on to the University of Utah?

Anderson: Yes, we both went on to Utah, and she graduated in home economics and English, and I graduated in geological engineering. From there I went to Harvard, and she took a job teaching--she had her teaching certificate as well. She took a job teaching in the Boston schools for three years while I went on for my master's and doctor's degrees.

Swent: You went right on from college to graduate school.

Anderson: Yes.

Swent: Did you work summers when you were in college?

Anderson: Yes.

Swent: In mines?

Anderson: Yes. Well, it was with Kennecott, with their exploration group. I spent the summers in the field in the West on exploration projects.

Swent: Where?

Anderson: There were several projects in Arizona and around the Ely area and the Battle Mountain area in Nevada. In Arizona it was around Ray, Arizona, and Kingman, Arizona, and even around the Morenci and Safford areas.

Harvard Graduate School; Geology Professor Hugh McKinstry

Anderson: I picked Harvard as a graduate school because of [Hugh] McKinstry, who was one of Don McLaughlin's students in the early days.

Swent: I knew Hugh McKinstry.

Anderson: Hugh McKinstry was a fabulous educator, very successful in the mining exploration business, and I knew of him through my undergraduate career, and I wanted to go to Harvard because he was there.

Swent: Had your geology teacher known Hugh?

Anderson: No. I just read his book on mining geology and heard a lecture that he had given at one of the mining clubs in Salt Lake at

one time when I was going to school. So he inspired me, and I wanted to go to Harvard.

Swent: He was a lovely man.

Anderson: He was. And so after the first year I became a teaching assistant with him and taught his ore-finding class and ore mineral laboratories. And he was my thesis advisor.

The Ph.D. Thesis on Using Manganese Oxide as a Guide to Ore in the Tintic District, Utah

Swent: Oh, I see. And what was your thesis?

Anderson: It was on the Tintic District in Utah. It was an exploration thesis on the use of manganese oxide minerals as a guide to ore in that district. It was an exciting field and laboratory program, and when I went to work with Kennecott they were starting to explore in the Tintic District, and we were able to use that with success in finding some of the ore bodies related to the Burgin Mine, which was found and developed by Kennecott. It was a silver-lead mine on the very eastern part of the mining district.

Swent: And manganese oxide led you to find it?

Anderson: Well, in part; not the main mine, but some of the ore bodies there. Some of the manganese oxides were just related to weathering of non-ore minerals, and others related to weathering of ore minerals. You can distinguish them by x-ray and by chemical analysis.

Swent: So you finished your Ph.D. in three years? That's pretty fast.

Anderson: Yes. Along the way I got my master's and then my Ph.D.--I finished the course work in 1960, and then I went to work for Kennecott full-time and actually finished my thesis in 1965. So there was a gap where I didn't go to school but worked for five years. Then the company gave me three or four months off to finish the thesis, which I did, and graduated in '65 with a Ph.D.

II EXPLORATION GEOLOGIST FOR KENNECOTT COPPER CORPORATION, 1960 TO 1967

Developing and Refining Procedures for Copper Exploration

Swent: So you finished your Ph.D., and there was of course no job-hunting because you were already working for Kennecott; is that right?

Anderson: That's correct.

Swent: What was your role at Kennecott? What were you doing?

Anderson: My first role at Kennecott was a research job to develop exploration technologies primarily for copper deposits. There was a research facility in Salt Lake City called the coordinating unit, and their sole purpose was to refine exploration procedures and develop new procedures for copper exploration.

Swent: So you were not out just tramping around the fields picking up rocks?

Anderson: Well, that was part of it. I mean, you had new ideas and approaches, and we had to go out and sample a lot of deposits and then study the rocks and see what they told us and see if there was some continuity between hundreds of deposits, which, it turned out, there was. So that's why I spent a lot of time in the field, but traveling all over the world looking for copper deposits to try to refine some of these ideas.

Swent: It sounds as if it was more theoretical and intellectual work.

Anderson: It was at the start, but it became a very sophisticated and very successful exploration technique with time.

Research on Leached Cappings

Swent: How did it differ from other techniques?

Anderson: Well, it used many of the new techniques of exploration, particularly trace-element analyses and physical chemistry and thermal dynamics of the formation of minerals to look at surface outcrops of mineralized zones to determine whether there had been copper in them--and whether there was copper that had been there and leached out--how much had been there, and if it would be reprecipitated and enriched at depth they were called chalcocite enrichment nodules.

Swent: Reprecipitated--

Anderson: Copper would be dissolved out of the surface rocks and reprecipitated at greater depths in an enriched zone called a chalcocite enrichment blanket.

Swent: Is this also called "secondary enrichment"?

Anderson: Right. It's secondary copper enrichment. And the rocks at the surface were called leached cappings, and this research was focused essentially on leached cappings.

Swent: And this was something new at that time?

Anderson: Yes. It was very proprietary for maybe twelve years or fifteen years in Kennecott, but eventually it was published, and it's in a publication of the Arizona University of Tucson, the porphyry copper volume. It's generally practiced now, but in those days they considered it very proprietary. You couldn't talk about it; you just had to be an employee to learn about it.

But that took me around the world, because once we had developed and proved the concept in the United States we wanted to check it in different climatic conditions, in jungles, in deserts, and in different geological terrains. So that's why I spent a lot of time away from home. Chile, Peru, Mexico, Australia, Canada, U.S., all over. Primarily it was the copper areas.

Traveling the World in Search of Copper

Swent: Primarily looking for copper.

Anderson: Yes, right.

Swent: Where were you in Chile?

Anderson: I visited all the then-known porphyry copper deposits all the way from Chuquicamata in the north to the Braden or El Teniente deposit in southern Chile. In Peru, I went all the way from southern Peru at Toquepala and Cuajone all the way up to the northern part of the country. And I looked at a few of the copper deposits in Mexico, particularly the ones near the U.S. border.

Swent: These were places that Kennecott was not yet operating?

Anderson: They were operating the Braden deposit in Chile, but not other South American areas. We were able to make arrangements with other operators. Geologists wanted to see everybody else's mines--we got to see theirs, they got to see ours, and then see what you could put together from it. We visited just about all our competitors' mines, but the competitors' geologists visited ours as well.

Swent: Sounds like fun.

Anderson: It was quite competitive.

So after that was done, it led to some good successes—

Swent: What were some of the successes?

Anderson: We found several deposits in new areas, plus new deposits in existing operating areas. It also allowed you to conduct the exploration a lot cheaper, and walk away from barren areas very fast and not spend a whole lot of money testing areas that didn't have much potential. Because of that, Kennecott had been approached by some Middle Eastern governments, namely Saudi Arabia, Turkey, and Iran, to evaluate the copper and other mineral potentials of those countries. In those days they were getting very low royalties for oil; they needed another mineral income. I was assigned to a special project--

Swent: This was in the late sixties?

Anderson: It was in '63, '64. Middle sixties. And I spent six months in each country doing reconnaissance for copper, gold, and silver-lead-zinc deposits, but with the primary emphasis on copper.

Swent: You alone?

Anderson: Yes. I had all the help I needed from the various geologists in the countries that I was a guest of, and in Saudi Arabia the French Bureau of Geological Research--called BRGM--was there to aid me in getting me around and showing me some of the geology areas. In Turkey there was a Turkish government geology research group, and in Iran it was similar--some Iranian geologists that knew the terrain and generally where there were occurrences. So I spent six months in each country just looking at occurrences and trying to determine if there were any of value. Iran is full of huge copper deposits that still have not been developed.

Swent: Amazing--as long as they've been mining there.

Anderson: Exactly.

Swent: Thousands of years, isn't it?

Anderson: It is. One deposit was developed after I recognized its potential--one called Char Chesmah.

Swent: Oh, I've heard of that.

Anderson: It was a very large copper deposit, and I told Kennecott about it, but I was very worried about the nature of the arrangements you might make with the government. If it were a huge copper deposit, and since the military ran the only copper refinery in Teheran, I was worried that this would become a very strategic military development and it might be confiscated by the Shah. Sure enough, after it had been developed by several other companies--investing probably well over $100 million--it was confiscated by the Shah after it was in operation. When the Shah got kicked out it was closed, and I think it's just rusted since. It just sits there in Iran, near Isfahan. It's a fabulous copper deposit, but there are two or three others that are even more fabulous than that that haven't even been touched yet.

Swent: So did Kennecott go into any of these?

Anderson: No, they decided not to because of the business risks. Clearly, of the three countries, Iran is geologically more like the western United States. There's a thrust province and a

mountain building zone, but instead of an uplift like the Colorado Plateau, geologically it's a stable area called the Great Dasht Depression where the rocks went down rather than up, so that's the only difference. You have all the thrust belts and porphyries and intrusives, all of the things that are required for major ore deposits, and they have them all there. But it's not been touched, really.

Turkey has a lot of potential for silver, lead, and zinc, primarily. And in Saudi Arabia--it turned out, Kennecott wasn't really interested--it was gold. There was an old mine that operated in King Solomon's time; it's called the Mahad Dhab Mine, and that's now being operated by the Saudis. They drilled it out below the water table, and it's a very nice deposit; it's probably two million tons of 2-ounces-per-ton gold--in that order of magnitude. It was mined by King Solomon in his day. You could see spiral staircases used for access in the shafts. They mined to the water table and had to stop. The gold was in quartz veins. The miners took all the quartz out of the vein, brought it up to the surface and hand-sorted it there.

Swent: And you saw that?

Anderson: I saw that, yes.

Swent: I think Newmont was interested in Char Chesmah also, weren't they?

Anderson: Oh, sure. Let's see, I think it was RTZ, Rio Tinto Zinc, who started it, and Anaconda became operator after the Shah confiscated it. I believe Anaconda got a management agreement with the Shah to run it. Then the Shah was kicked out, and that was the end of it. It was just in the startup phase; maybe it had been operating for six months or a year, maybe a little more.

Swent: You were there for Kennecott, but were you also advising these people who accompanied you?

Anderson: I was there for Kennecott, and my advice went to Kennecott management, they decided what to do with the information.

Swent: Were you advising the governments of these countries at all?

Anderson: No, except they had geologists along who could speak English very well, and they could see what I was looking at, and they probably prepared their own reports. But they didn't have the experience of leached cappings and knowledge of major copper

deposits that I did, so they could see the areas we visited, and they probably could see some of my enthusiasm or lack of it by the questions I asked and how long I stayed there.

Swent: How did you feel about Char Chesmah?

Anderson: Oh, I think it is a fabulous deposit. As I say, there were a couple more that--

Swent: But Kennecott did not--

Anderson: No, they didn't, because of the economic risk.

Swent: And political.

Anderson: Primarily political risk, yes. And that turned out to be the right assessment after all was said and done.

III VICE PRESIDENT OF EXPLORATION FOR OCCIDENTAL MINERALS, 1967 TO 1975

Paul Bailly

Swent: So then you left Kennecott and went with Occidental. You were the vice president of exploration. How did that come about?

Anderson: My boss at Kennecott left to form a hard minerals division for Occidental. He reported directly to Armand Hammer and formed a minerals division. So I applied to him for a job because I liked working for him very much.

Swent: Who was he?

Anderson: His name was Paul Bailly. He's a world-renowned, successful geologist working for Kennecott from the time he made his career start and worked up to be president of the exploration subsidiary called Bear Creek Mining Company. Then he formed Occidental Minerals for Armand Hammer, and I think he did that in early 1967. The dates I'd have to look up. Then I joined him in late '67 until 1975.

Swent: And where were their offices?

Anderson: Here in Denver.

Swent: In Denver. So you had been primarily based in Salt Lake.

Anderson: That's correct. Well, my wife and I moved twenty-four times in twelve years prior to moving to Denver, so we never owned a home; we always just rented apartments.

Swent: Was she able to go to places like Arabia and Iran?

Anderson: No, she didn't go to those places. She would meet me after a trip. In that case I was gone eighteen months without seeing

her, and when I came back we met in Cairo and toured Egypt and Israel and Greece and came home. While I was gone for eighteen months, she lived with my parents.

Swent: Oh, that's a long time without a break.

Anderson: Yes.

Swent: These twenty-four moves you made were in the Southwest?

Anderson: Primarily the southwestern United States, that's right. From one mining town to another, or one mining project or exploration project to another.

Swent: That's a lot of moving.

Anderson: So then we moved to Denver. Occidental Minerals was primarily interested in copper, although gold was an important consideration in those days.

Armand Hammer[1]

Anderson: Armand Hammer took a real interest in the minerals group, and he would call me personally every Saturday night about eleven or twelve at night from Beverly Hills--but here it would be about one or two in the morning. Every Sunday morning he would want an update on some of the projects we were working on. He was very keenly interested in those things, so he would call, and I would have to go to bed at seven or eight at night on Saturday night and get up at midnight knowing the call would come and be prepared to give him a rundown on the week's--it was every week; sometimes he would call from Europe, sometimes it would be from L.A., sometimes he would be in Argentina or wherever. He was very interested in several of the projects: one of the copper projects we were working on and a zinc project in Tennessee. So he would call up and get a progress report once a week.

Swent: No matter what time it was.

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[1]For more on Armand Hammer, see Günther Franz (Frank) Joklik, Exploration Geologist, Development of Mt. Newman Mine, President and CEO of Kennecott, 1949-1995; Chairman, 2002 Olympic Winter Games Committee, Regional Oral History Office, The Bancroft Library, University of California, Berkeley, 1997, pp. 251-253.

Anderson: Well, it was when he was ready. He would go out for a swim or exercise at eleven o'clock at night at his home in Beverly Hills and then he would call after he got back in. He didn't care what time of day it was; he wanted to know.

Swent: What would happen if you weren't there?

Anderson: He would probably chase me down wherever I was.

Swent: Did he do this to other people as well?

Anderson: I think some of the foreign oil and gas people got similar calls, but in the minerals group I was about the only one, because I was in charge of the U.S. program, and he was very interested in that.

The Gores of Tennessee[1]

Swent: And it was through him that you got to know the Gores.

Anderson: Yes. They have a farm in Tennessee which, it turns out, overlies a zinc deposit. I had heard about the discovery and went back there to look at it and found drill rigs lined up on their property boundary, so I started negotiating with the Gores. I didn't know it, but it turned out they were very close friends of Armand Hammer's, so that helped the negotiations a bit in some of the competition. We acquired the property and drilled it, and there was a zinc deposit under the Gore farm.

Swent: You actually bought it from them?

Anderson: Occidental had a lease, and I think that lease has been now assigned to the company that mines that whole zinc area. They've acquired New Jersey Zinc's interests and Occidental's interests and a smelter. It's a major zinc producer.

So I met Senator Albert Gore and his son, who is now the Vice President of the United States--Albert, Jr.--and his mother, Pauline, who is a very brilliant lady.

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[1]For more on the Gores, see Simon David Strauss, Market Analyst for Non-Ferrous Metals and Non-Metallic Minerals, Journalist, Mining Corporation Executive, 1927-1994, Regional Oral History Office, The Bancroft Library, University of California, 1995, pp. 236-241.

Swent: You said you actually worked with her?

Anderson: Oh, yes. I did most of the negotiations with her.

Swent: I hadn't realized--you said she was an attorney.

Anderson: Yes, very brilliant. She was in Washington, D.C., and somehow involved with the TVA, the Tennessee Valley Authority. Very brilliant businesswoman.

Swent: Tough negotiator?

Anderson: Absolutely.

Swent: Really?

Anderson: Yes, a lot of fun though. It turned out to be a lot of fun.

Swent: So you were involved not only in just the geologic exploration but also the negotiations.

Anderson: All the business aspects of exploration plus development, up to the point where you turned it over to operations, the people that will build and operate the mine.

More About Armand Hammer

Swent: Did you enjoy--

Anderson: Yes, I enjoyed that. It was a very unique opportunity. I would hear about Hammer's exploits--we would go down to his house probably once every couple months and meet with him in his home. Every time we went in his home he had a different art collection. His brother had a fabulous Russian art collection that he acquired, and every time you went there was a new series of art on the walls. It was fabulous.

He was a brilliant man. He would listen to an hour presentation and then ask one or two questions which were really at the heart of it. He just had a keen ability to sense out where the key issue was, the important business decisions. A very dynamic person. It was exciting. But then a more exciting opportunity came along, which was to join Homestake and work with Don McLaughlin and Paul Henshaw.

IV VICE PRESIDENT OF EXPLORATION FOR HOMESTAKE MINING COMPANY, 1975 TO 1987

Homestake's Desire to Find a Major Gold Deposit

Swent: How did that come about?

##

Anderson: It was November, 1975, when I joined Homestake. Homestake had decided to make a search for vice president of exploration for the U.S. They talked with my boss, Paul Bailly--tried to hire him--

Swent: Who had talked to him? Do you know?

Anderson: It was the search committee represented by a management consultant group out of New York. I think it was Anderson Consulting--no relation to me. I forget the name of the person.

Swent: Headhunters?

Anderson: Yes, headhunters [laughs]. They talked to my boss, and I didn't know it at the time, and apparently he was very satisfied with what he was doing, so then they talked to me, and we had a series of interviews with every one of the senior management and board members. I remember distinctly.

Swent: Where did you have these?

Anderson: I had to travel to wherever they were. Sometimes in San Francisco. I met Don Delicate for the first time at Lead [South Dakota] and spent a couple days up there interviewing with him. It was a very thorough interviewing process. All of

the key people in the company--Dick Stoehr[1]--I even remember talking to the attorneys. I met with Langan [Swent][2] there on one of those trips, and also John Gustafson. But Don McLaughlin and Paul Henshaw were the key players in terms of the interviews, arranging them and--

Swent: Don McLaughlin was chairman--

Anderson: No, at that time John Gustafson was chairman. Don had retired from the chairman position. Paul was president.

Swent: Okay. Don was emeritus, and John Gustafson was chairman, and Paul was president. And they were all geologists.

Anderson: All geologists. All had exceptional careers in--

Swent: All Harvard geologists.

Anderson: All Harvard, and they understood the risks of exploration and the business parts of exploration. Since I really wanted to focus on exploration rather than convincing senior management of the risks involved in exploration, I wanted to take some amount of money and patience--that was already built in, so it was an exciting time. And Homestake had not done any serious gold exploration since probably the forties, after the war, when the Homestake Mine was closed down for a while. Then they started looking for copper, lead, zinc, silver, and uranium very successfully, but had not looked for any gold because there was no economic incentive. By 1975, of course, the gold price had been freed, it was quite high, and it offset the inflation of operating costs and became a real window of opportunity to find economical gold mines. Secondly, during the period of the war and for the next twenty years afterwards --into the mid-seventies--there had been great advances in exploration technology and knowledge of deposits and geological modeling and concepts.

Swent: I'd like to be a little more specific about those. First, if you don't mind, I'd like to have you just tell what--it might have been Don Delicate who told you about the power plant.

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[1]Richard Stoehr, interview in the McLaughlin Mine/Knoxville District oral history project, Regional Oral History Office, The Bancroft Library, University of California, Berkeley, in process 1997.

[2]Langan W. Swent, Working for Safety and Health in Underground Mines: San Luis and Homestake Mining Companies, 1946-1988, Regional Oral History Office, The Bancroft Library, University of California, Berkeley, 1995.

Anderson: Oh, yes, it was Don Delicate that said that Homestake had this very profitable coal reserve called Wyodak Coal and had built the Black Hills power plant, and that the Homestake Mine was using a significant amount of its power from the Black Hills power plant. I think they were making extra power and were selling it. And during that period of time anyway, and before that, the profits of the mine were very minor or sometimes loss years, and the power facility was making more money than the mine.

Swent: Gold was thirty-five dollars.

Anderson: Yes, gold was thirty-five dollars an ounce, and at that time--this was before the discovery of uranium and lead--he told me that Homestake had been worried that they were going to be regulated as a public utility because that was their main business. So they decided to sell the power plant and lease the coal reserves to Black Hills Power and make it a royalty income rather than actual operating income. But then, of course, I think you know it changed a bit, but that decision had already been made, and they had already sold it. The Buick lead mine became a very, very profitable mine and so did the Grants uranium deposit which you and your husband were so intimately involved in. And that was one thing that impressed me about Homestake: they understood when they had a significant deposit and could go ahead without having to spend months of, shall we say, convincing everybody to determine whether it was going to be a mine or not. I think all three of those fellows --and Langan too--could see that if you had a 1-percent-uranium deposit, and everybody else was mining fifteen-hundredths-percent-uranium deposits, you probably have a pretty good deposit. And the paperwork was minimal.

Swent: How did Homestake compare in size with Kennecott and Occidental?

Anderson: A lot smaller. Much smaller. And also, profits were good in those years; they were in some years as profitable as the bigger companies, but the revenues and the number of people and so forth were an order of magnitude smaller at Homestake. It was more a family. You could feel like you could achieve something, and if you did, you would have a major impact on the company, which, I think, the McLaughlin discovery did. I mean, the stock doubled in a year after that discovery was announced. I enjoyed going from a bigger corporate environment to a smaller group where everybody worked together closely as a team, you knew everybody, and you knew where you could go to get help directly without having to go through layers of staffs and people to find somebody.

Advances in Exploration: Mineral Zoning of Deposits

Swent: I really kind of interrupted you, but you were going to say that there were these new developments in exploration geology as well.

Anderson: Right. In most of the developed countries by the late fifties and sixties, most of the areas where ore bodies outcropped at the surface had been pretty well looked over and mined already. So you had to find deposits that are concealed, basically--not outcropping at the surface. So you had to look at subtle indications that there might be something at depth. Geologically, there had been a lot of advances in what's called zoning, mineral zoning of deposits, so you can tell--if you visualize a target with a bull's-eye in it--the bull's-eye being the ore zone--and there's rings around that--that's very simplified, but you could see what the rings were, and each type of deposit had different types of rings around it so you knew that if you were in a copper province what sort of things to look for on these outer rings that might be exposed at the surface--and the ore deposit buried. The halos are much bigger than the ore body. Let's assume in a copper deposit maybe the altered zone is three or four miles in diameter, and the ore body is maybe a half a mile in diameter. I'm talking about a porphyry copper deposit. So if you can visualize the ore body as being sort of the center of a bull's-eye, and it's buried a thousand feet, you still see these other halos, other zones, at the surface. And you can tell about how deep it might be to the ore body, and also whether there might be ore there or not.

Swent: Do you just see them visually with your eyes?

Anderson: Well, that was part of my research at Kennecott: to determine visual indications that were refined, and also use geochemistry as well and try to decipher out of the outcrops using visual indications of what minerals were there, plus geochemistry, which is really a combination of chemistry and trace element amounts of copper, lead, or zinc or other indicator elements--that might be there.

Swent: And how do you do the geochemistry? You pick up a rock and send it to somebody?

Anderson: You collect samples and then send them to a laboratory that has a spectrometer to determine small amounts, like parts per million in copper--ten or twenty parts per million, which is a very low amount.

Swent: And these are things that could not have been done fifty years ago.

Anderson: That's correct. Until the invention of the mass spectrometer, you couldn't do any of those things at all. And of course with that invention, which was really first used in Canada to determine illnesses related to lead contamination around the Trail smelter in British Columbia--. A geologist had developed a methodology of sampling and analysis, and proved that there was lots of lead contamination around the smelter, but it was in very small amounts, like one or two to ten parts per million, which is a very low percentage. And assay techniques would never detect any amounts of lead even there but this new approach did. So we had all that technology available for copper, lead, and zinc deposits, and at Kennecott we researched all that. I did a lot of that research. So we knew what these bands, if you would, around the bull's-eye looked like, and we knew what elements would be concentrated in them in trace amounts and what minerals would be there. And so the opportunity was to apply that to gold; it had never been done when I was thinking about joining Homestake. And Homestake hadn't done any of that work, and they were still looking for lead and zinc and copper all around the world, basically, using sort of a shotgun approach, which had worked very well for its day, but not for gold. So we really took a rifle approach in looking for gold deposits in the U.S.

Classifying the Gold Deposits of the World

Swent: These would be not just the old traditional vein deposits? Was it something else?

Anderson: Well, the first thing I did after I joined Homestake--it probably took about a year and a half of research, which I did mostly at night because I didn't have time in the day to do it; we were too busy trying to organize and evaluate properties that were already in hand--was to conduct research of the various types of gold deposits around the world and also to find out if gold deposits, like every other deposit, had these indicator halos. So we did some research on that, and put together a chart that shows--at that time--the known types of gold deposits in the world.

Swent: You said that there were five, I think?

Anderson: Major types. There were more than five, but of the major ones that would be of interest to Homestake there were about five.

The South African Rand Deposit

Anderson: Clearly, one of the major deposit types in the world is the South African Rand--the Witwatersrand deposits were major gold deposits, but they're very limited in extent in other countries of the world. There's some in a few other countries but they're very small, not developed to the extent of Witwatersrand. So that became a geological target, and we looked in those areas that were permissive for them but really didn't find anything that would be suitable. Even if you found the Witwatersrand in the United States, you couldn't mine it because of the environmental and safety procedures required in the U.S. They mine those "veins" one meter wide--I mean, it's not a vein, it's a bed. That's three and a half feet, and the drillers and the miners can't stand up; they've got to crawl around on their knees and elbows. The backs were very unsafe and in this country--

Swent: The backs of the mines, you mean.

Anderson: In the U.S., we would have to mine it probably ten feet high rather than three and a half feet high, and if you had to mine that much more waste it would not make those deposits economic.

Swent: You've called that a fossil placer.

Anderson: Yes, right. It was a placer deposit at one time; it had been eroded from veins and coalesced in gravels and streambeds. Then those beds were further buried and subjected to metamorphism and burial at depth. So the placer became solid rock again. That's what they mined.

So those are major deposits of the world.

Carlin and Homestake Gold Deposits

Anderson: There are disseminated gold deposits like Carlin, Nevada; there are vein deposits--high-grade and lower grade. The Homestake Mine is a specific type of gold deposit that occurs elsewhere in the world besides Homestake Mine.

Swent: What characterizes that?

Anderson: It's basically gold that occurs in an iron formation; it's been metamorphosed. It doesn't have to be metamorphosed, but it usually is. And those deposits occur, of course, in South Dakota; they also occur in Brazil; there are some in Canada, and so one of our objectives was to find some more Homestake Mines not only in the Black Hills but elsewhere.

Swent: I was wondering why--and you explained one reason why--you identified these five major types of deposit, and then you selected only two to concentrate on. You've explained that one reason was just that you couldn't work people in a three-foot vein in this country. What were some of the--

Anderson: Well, in this country the geological terrains have to be right also. Different types of gold deposits occur in different geological settings, and if those geological settings are not present in the country you're in then you can't look at those types either. My focus at that time was the U.S. The stockwork disseminated type of deposits were really the key thrust, plus the Homestake Mine type.

Swent: And where did you--

Anderson: We looked for those all over, primarily in the western United States.

Swent: Where have the types been?

Anderson: The Carlin Mine[1] in Nevada is a stockwork, a typical example of what I'm talking about. A disseminated gold deposit. That mine was known, of course; it was fairly substantial.

Swent: That was found in the early 1960s.

Anderson: Exactly. So we put together this list of mines around the world, but we also knew that other people at least knew of some of those types. I mean, they've been reviewed in the literature, in hundreds of publications. But nobody had really put them together in sort of one piece, at least that I could determine, and I did a lot of research on it. So we put it together, formed our focus, but then I also decided that we needed to have something new and exciting that would be different: try to find a new type of gold deposit as compared

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[1]For more on Carlin, see John S. Livermore, interview in the Western Mining in the Twentieth Century series, in process 1997.

to just finding more of the same. From my experience at undergraduate school in thermal dynamics and physical chemistry--and more at Harvard--I had deduced that gold deposits ought to occur in hot springs, and if so, there are a lot of hot springs around the world to go look for it. All the literature that I had read had indicated that gold did <u>not</u> concentrate in hot springs, and that was very discouraging. So I took a vacation--

Swent: You had mentioned Waldemar Lindgren earlier.

Anderson: Right. Lindgren's publications on gold did not really focus on hot springs, and there were a few memos by him in various obscure publications plus some other reports by the United States Geological Survey that had endeavored to evaluate hot springs for mineral potential, and nobody ever found any gold in those hot springs and therefore [that] would suggest that even though theoretically it might be possible to find gold at a hot springs environment, it didn't exist. That bothered me greatly, so I took a vacation for a couple of weeks in Southern California, in the San Diego area, and during that vacation I spent every day at the UC [University of California] San Diego library.

Swent: When was this, do you think? Can you remember?

Anderson: It was probably late '77, October or so.

Swent: I hate to keep interrupting you but I noticed that you had attended this special course at Stanford [University] shortly before that.

Anderson: The Stanford course was after that.

Swent: After that, okay. I was trying to ask whether that course had any influence on the way you set up your--

Anderson: No, we set up the program, and then we had an initial discovery at the McLaughlin long before it was announced. It took us two years to drill it out. So I think after the management of Homestake knew that we really were on to something at McLaughlin, they sent me to Stanford. So that's the way it worked. It wasn't the other way around.

A Vacation Spent Researching Mercury Hot Springs

Swent: Okay. Well, let's get back. You already had a place at Coronado, you said.

Anderson: Yes, right. We just stayed there, and my wife was very interested in art so she spent a lot of time in the art museums in the area, and I spent all my vacation days and evenings at the UCSD library researching all the obscure publications I could to find out whether or not gold occurred in hot springs or not.

Swent: What sorts of publications?

Anderson: There are a lot of United States Geological Survey publications. There were publications by various societies like Economic Geologist, publications by the Mining Journal, mining publications in general. Some of them were published in German, some of them in French; I tried to read all of the literature that would be available. I have a reading knowledge of those languages but not a speaking knowledge.

In one very obscure observation--and these reports were restricted to hot springs, not just all mineral occurrences, but looking for hot springs--one obscure observation mentioned that all of the work done to that time had been done by panning, and nobody had found gold in hot springs. I read into that since at Carlin the gold was micron gold and couldn't be panned, and you couldn't see it without a high-powered microscope, that if nobody had ever assayed for gold and it was too fine-grained to pan, then it didn't prove that gold was absent in hot springs deposits. It may occur. It wasn't positive, but it didn't eliminate it completely either, because a lot of people had looked at hot springs.

I came back and discussed the concept with Don McLaughlin, I recall, and Paul Henshaw, and suggested that we consider implementing a major reconnaissance--a part of our reconnaissance program for a new type of deposit that I termed "mercury hot springs gold deposits." Hot springs commonly contain mercury and arsenic and antimony, and if there were those indicator minerals--sort of like in the halo of the bull's-eye I talked about before, around the bull's-eye--that there would be arsenic and antimony and mercury and silver in a hot spring environment. And if there were trace amounts of gold there, it might be a real important indicator. So what we should do is go up to the Homestake Mine and examine files representing a hundred years of investigations of gold deposits

not just in the United States but in many places around the world. Find out if any of the gold prospects had indications that they might be associated with hot springs and look at those first.

Homestake had a fabulous set of files at Lead in the vault. It was covered with spider webs and dust and everything. There were a couple senior geologists at Homestake that I really had a lot of confidence in, and I asked them to start researching those files.

Donald Gustafson Researches Old Homestake Files

Swent: And who were they?

Anderson: The most successful one was Don Gustafson,[1] who eventually went up and looked in the files. The second geologist didn't believe in the concept and didn't want to go get involved in it, so he left the company. So Don Gustafson and I were the sponsors of the concept.

Swent: What gave you the idea of looking at hot springs at all?

Anderson: Well, it was my knowledge of minerals and the formation of minerals. Each mineral is really an indicator of temperature and pressure and the environment around it. In studies at Harvard particularly, we studied environments of hot springs, and my knowledge of gold and the thermal dynamics and physical chemistry of gold and minerals suggested it should occur and concentrate in hot springs. So it was just an idea based on theory from my knowledge of thermal dynamics and physical chemistry that it should occur there. I persisted, and fortunately I had the time when I took the vacation to do the research, because if I wouldn't have found some indication that there was at least a slight chance, that the literature really ruled out gold being in hot springs, we wouldn't have followed up. But it didn't rule it out; as a matter of fact, it sort of opened the door a bit.

Don Gustafson probably spent three months looking at files on every prospect that had ever been examined by Homestake for

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[1]Donald Gustafson, interview in the McLaughlin Mine/Knoxville District oral history project, Regional Oral History Office, The Bancroft Library, University of California, Berkeley, in process 1997.

signs of hot springs--siliceous sinter, including mercury and arsenic and antimony occurrences as low-temperature minerals, such as stibnite, orpiment, and realgar, which are arsenic minerals. There is antimony in them as well. And to look to see if there are any of the gold occurrences that had some of those indications, particularly either the siliceous sinter from a hot spring--or evidence of a hot spring itself--or those minerals. He probably came up with four or five out of looking at thousands of prospects in the Homestake files, and it was a property that Homestake had looked at in, I believe, the thirties. I'm not sure of the exact time. It was called Wilbur Hot Springs, and we renamed it Cherry Hills.

Wilbur Hot Springs; Cherry Hills Deposit

Swent: Where was this?

Anderson: This is in Lake County, probably about ten to fifteen miles north of the McLaughlin Mine. There was an old mercury mine there. There was also a hot spring that erupts every two or three hours. There were several tunnels that Homestake had put in the sinter, and there was gold. So, in effect, it proved the concept. We drilled that property, and it turned out to have only several million tons of one-tenth-of-an-ounce gold. It wasn't economic, not big enough. But it proved the concept.

Swent: You started to say you called it Cherry Hills. Why did you select that name?

Anderson: I think there was an area downstream from the area that was called Cherry Hills.

Swent: What had the old mine been called? Do you remember?

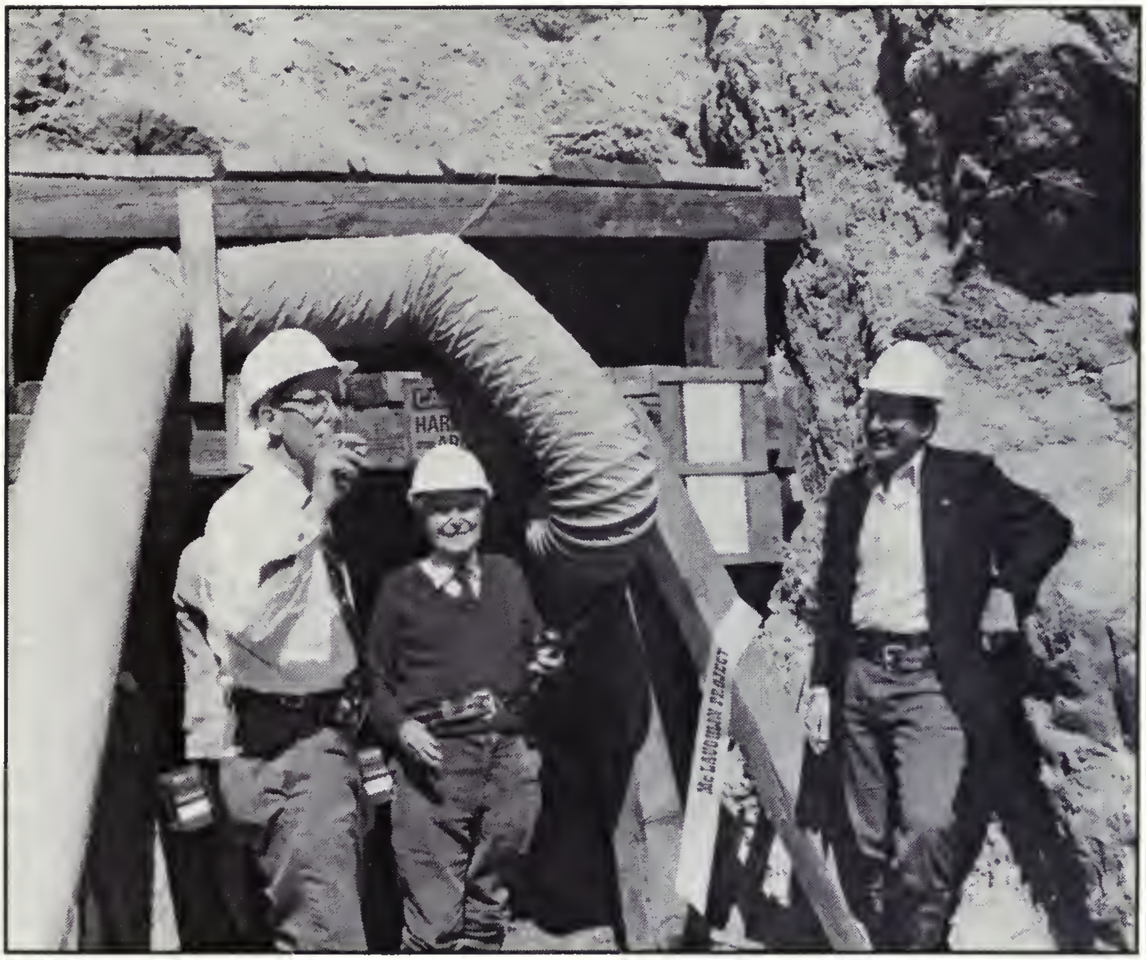
Anderson: I forget the name of the old mine, but it was a mercury mine. Mayacamas, or something like that. I forget the name of the mercury mine.

Swent: But you did find some gold there.

Anderson: Yes, and we found several million tons of maybe a-tenth-of-an-ounce gold, which wasn't of interest to Homestake for several reasons. One, it was too small to develop, not enough tonnage at that grade. Also was a refractory ore in the sinter like McLaughlin is. So you need a higher grade to be economic. But

it did one very important thing: it proved the concept that [gold] occurred in the hot spring environment.

From there on I went to the board, and we allocated a major portion of our U.S. reconnaissance program to search for more of those. And we made maps that showed--actually USGS had published a lot--all the known hot springs in the United States, all the known gold occurrences in the United States, all the known arsenic and antimony occurrences, and we just overlaid maps of the occurrences and then visited methodically those that had all of the indicators.



Left to right: Paul Henshaw, Donald McLaughlin, and James Anderson cutting the ribbon at the McLaughlin Mine, 1981.

Manhattan [McLaughlin] Mine, ca. 1981. Looking west, Mt. St. Helena on the horizon; Gail Ridge and sinter in center; Homestake Mining Company sample plant, bottom left.

V THE MANHATTAN/MCLAUGHLIN MINE

The One Shot Mining Company and Bill Wilder

Anderson: The very first one we visited after Cherry Hills was the old Manhattan mercury mine. Don Gustafson was the geologist on site and met the owner of One Shot Mining Company, Bill Wilder,[1] and made arrangements with Bill to evaluate the property with the idea that if we saw something we liked we would try to get an exploration and mining lease from him for mining. Well, I think he believed--from my perspective anyway--that we were not only after gold but we were after geothermal wells. It was an old active geothermal area, and he was pretty knowledgeable about the Geysers area, which is only about twenty airline miles away. He probably thought that there was more value in geothermal than in gold, because he had never found any gold at the Manhattan mercury mine. He was at the time mining the sinter for ornamental stone and shipping it to Sacramento and selling it for stone on driveways and flower beds and roofs. It was beautiful sinter; it was very colorful, very pretty--and sold for just a minimal amount: maybe ten or fifteen dollars a ton. At the bottom of the pit where he was mining, Don Gustafson went in and sampled and found--on the faces that were exposed over several hundred feet--gold values averaging about an ounce a ton.

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Swent: I think you're going a little fast here. You identified this area as a place where antimony and mercury and the other indicators all came in together from these maps. Did you tell Don to go up there and look at it or did you go and look at it?

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[1]James William Wilder, Owner of One Shot Mining Company: Manhattan Mercury Mine, 1965-1981, Regional Oral History Office, The Bancroft Library, University of California, Berkeley, 1996.

Anderson: Don had of course visited what we called Cherry Hills and recommended that we drill it. We acquired that and drilled it. Then he said the next priority on his list was, as I recall, the Manhattan mercury mine which was just ten miles away. There were some old sinters there, so he went up and got permission from Mr. Wilder for a one-day reconnaissance. He covered a lot of ground in one day. He took samples, and Mr. Wilder approved that and took samples at the same time Don did. Whenever Don took one, Mr. Wilder took one.

Swent: Had you ever met Wilder yourself?

Anderson: No. And I think Don had not prior to then either. We assayed the samples, and as I said, we found a zone that ran over one ounce of gold in the sinter that he was mining. This was a very exciting property because it was very large. Wilder had his chance to run assays--but I think he just put the samples in his trailer house and forgot about them.

Swent: How did you actually--Don took this sample--

Anderson: It was probably a hundred samples that he took.

Swent: And he mailed it to an assay place--

Anderson: An assay lab, right.

Swent: Where?

Anderson: I think in those days we were using Union Assay in Salt Lake City.

Swent: And then the results came back by phone? By mail?

Anderson: Both. By phone at first and then by mail.

Swent: First to Gustafson?

Anderson: Yes.

Swent: And then he picked up the phone--

Anderson: And called me.

Swent: Tell me the story; how did it happen? When did you first hear this?

Anderson: Well, I heard it from Don. I guess it was over the phone. He said, "I really have some exciting results here. We need to

acquire this property." He told me something about it, and then he faxed me--I think in those days we had faxes. Either faxed or mailed. I think it was probably before the fax; close to it anyway--because I know that during the major assaying campaign during the development and drilling we had faxes. Maybe at this time we didn't.

Anyway, he came over and showed me his maps and the sample results plotted on them. He wanted to acquire the property, so I said, "Please do. Go ahead and see if you can negotiate an arrangement with Mr. Wilder." That took a lot longer than I had ever dreamed it would or hoped it would.

Swent: Why?

Anderson: I think it took six or eight months, and we were sitting on these fire assay results in a completely new geological model type. In the meantime, of course, we continued the reconnaissance looking elsewhere. Don had prioritized all of the known occurrences: Cherry Hills was number one, McLaughlin (Manhattan Mine in those days) was number two.

So it took a long time to acquire the property, but we finally did, and the first ten holes he drilled were ore holes, and about the average thickness and average grade of the deposit.

Reassuring Bill Wilder about His Rights

Swent: Were you involved in the negotiations to acquire the property?

Anderson: Yes, on several occasions. I met Bill Wilder and went up to give him the commendment of Homestake's management that indeed we were looking for gold and not geothermal wells, and that we would exclude--I think I was the first one that maybe told him we would exclude geothermal rights if he was worried about that. He could maintain geothermal rights and develop those on his own, and we would have to work out an arrangement if the gold mining interfered with the geothermal and how we would handle that. I wasn't worried about geothermal; I didn't think there would be any geothermal potential. And if there was, it was probably off to the side of the property that we then knew as being of interest anyway, so there wouldn't have been any real problem with mining and geothermal wells themselves. Geothermal wells can be angle holes and drilled by directional drilling methods and go quite a ways away from the surface

location. The geothermal potential would have been probably seven or eight thousand feet to the source, rather than a few hundred feet.

Swent: I didn't realize there was any active geothermal activity there.

Anderson: Right there, probably a million years ago, it was very active, but there are still some hot springs that are depositing what we call calcareous sinter. It's a form of calcium carbonate, instead of a silica sinter. And you can see on very rare occasions those are bubbling up. Usually they're warm; they're not hot enough to be steaming, but warm water is coming out of the springs and depositing calcium carbonate. So it's the waning phase of volcanic activity in that area. It's off to the edge of the geysers, obviously.

So we finally negotiated an arrangement with Mr. Wilder, and we had a royalty which we could buy half of. I insisted that he keep the other half, so that if we found something very large and big he would be treated fairly. It turns out that's what happened.

After we drilled these first ten holes and assumed that we were probably on to something at least economic if not major, I was particularly worried about environmental attitudes and development attitudes in northern California.

Swent: Did you have your own drillers?

Anderson: We had contract drillers. It was a well-known--I forget the name--contract driller that provided all the equipment and the manpower. We just collected all the samples.

Swent: The reason I asked that is I was wondering if there was any concern for security.

Anderson: Of course. Very elaborate. I mean, the drillers could not touch the samples, they couldn't see the core. It was very clear that it was top priority, confidential drilling. But they couldn't see the gold in it anyway, but we still took those precautions.

Swent: Was Wilder pretty excited when you told him, or did you tell him the extent of the samples you had gotten? Did you let him know how rich it looked?

Anderson: We told him we found gold in the samples, but we didn't give him any assay data. We didn't have any obligation to--unless we acquired the property.

Swent: This is part of your negotiation; you pretend it's not as much as you think it is.

Anderson: We negotiated with the idea that we were after a gold mine. He had taken samples in the same places we did, and all he had to do was assay them but he didn't think enough of the gold potential to even assay them, I think. That was probably what happened.

He did not know the extent of what he had until we announced the discovery, because that was very important too. We didn't have all the land we wanted, it turns out. We staked a lot of claims around him, but to the south of us was the Gamble Ranch. The Gambles didn't want to make any deals with anybody on the ranch. He had the old mercury mine on his property at Knoxville.

The Gamble Ranch

Swent: You couldn't stake any claims on his property.

Anderson: No, because that was private fee land. It was the very northern end of his ranch, which goes all the way down to Lake Berryessa. His ranch house is on the shore of Lake Berryessa. He has a lot of acres; it's a beautiful, beautiful ranch.

We must have drilled for two years before we knew the tonnage and grade and if it was economic, and we had a process for it--the autoclaves.

Swent: What arrangement do you make with somebody to be drilling before you actually acquire the land?

Anderson: Oh, we didn't; we had a lease. We couldn't drill until we had the lease agreement.

Swent: I see, but you had done the sampling first just--

Anderson: Just in his old pit there where Mr. Wilder was mining and selling the ornamental stone and the whole surface area, that was all. Remember I told you about how there's a bull's-eye

and the rings? We sampled the rings, and we could tell about how big the gold deposit was going to be.

Swent: But you just get his permission to go in and sample, is that it?

Anderson: On the first pass. We just got his verbal permission. We said, "You can join us," and he did; he walked with Don, I think, to every sample site. You'd have to check with Don whether he took a sample at <u>every</u> site, but I know he took some samples. But he didn't believe there was gold. As I told you, I think he thought that we were after geothermal rights. But he had the complete set of samples that we had--he had taken his own--so he could have assayed them if he wanted to. I don't think he did, but he may have.

Swent: It took you two years.

Anderson: At least two years. We started drilling in '78, I think, and we announced it sometime in late 1980.

Swent: I think the announcement was in August of 1980.

Anderson: Whatever the date was, you can look it up. I can't recall exactly.

Swent: Well, that's a long time later.

Anderson: Probably four hundred drill holes.

Swent: A lot of money spent.

Anderson: Yes, it was about six or seven million dollars by then. And the day we announced it, there were probably fifty mining companies the next morning over there looking for open land. We had staked claims for everything we needed for waste dumps and mill sites and everything, so we had all we needed except Mr. Gamble. Mr. Gamble wasn't prepared to make any deals, but it turns out he finally did after I left Homestake. He made a deal, but there wasn't anything on his land anyway. We predicted, from our mapping of the zones and so forth, that it would be right at the edge; there might be a little ore a few hundred feet on his property, but not very far. So after a while we said, Okay, we can make this announcement because we're not going to give up half the ore body. If we were to give up anything away it might be 5 or 10 percent.

Awareness of the Environmental Aspects

Swent: I think I interrupted you a little earlier. You started to say that you were aware from the beginning of the environmental aspects.

Anderson: I commissioned what we called in those days a "white paper," where myself and one of the prestigious law firms in San Francisco went up and interviewed--

Swent: Which? Can you say who it was?

Anderson: I think the law firm was Thelen Marrin [Johnson & Bridges]. They had a person very knowledgeable about the environment laws and practical aspects of it. He and I spent a lot of time in Napa and St. Helena and Calistoga and all up and down the wine country talking to the board of supervisors, the important business people, some of the wine growers and vintners.

Swent: Do you remember the name of the lawyer that went with you?

Anderson: I forget his name. He did a lot of the work. We didn't necessarily just travel together; he would go up on some days, I went up on other days, and we both picked out a list of people. The white paper was written by him; it's in Homestake files somewhere. But after--I think it was probably six months--we had probably by then spent about a half a million dollars.

Swent: This was while you were still drilling?

Anderson: Just the initial drilling after the first ten holes. We knew we had something. But if we had something, could we permit it, could we develop it and so forth? The deposit is sort of out of sight, up in the far reaches of the county--it's as far away from developments as maybe the Geysers area was, and it's all in rugged terrain. But the general public, the business leaders in the community, and even the board of supervisors and the city officials were, I would say, reasonable. They weren't anti-development; there were some people that were completely anti-development. On balance, I concluded, as well as the lawyer from Thelen Marrin, that if we found something there, there would be careful and reasonable consideration and that if we took the proper precautions we could probably develop a mine. This was at the same time that the big refineries at Richmond were being proposed and killed by the environmentalists. And the labor unions were against them, too. So there was a lot of pressure not to do anything.

Ray Krauss[1] tells me that after we got all our permits and so forth, that the attitude in Napa County, particularly, changed, and that had we done it five years later we probably wouldn't have had the support in Napa. As it was, there was a group of very vocal anti-development people in Yolo County, and a very well-versed and eloquent speaker from the English department at UC Davis who led the Yolo attack.[2] Ray has probably told you all about those things.

Presenting Homestake to the Community

Swent: Specifically who were some of the people? Do you remember some of the people you talked to in Napa County?

Anderson: No, I don't remember the names.

Swent: I was wondering how you--you don't just walk in and say, "We think we've found a big gold mine."

Anderson: No, no, we said, We represent Homestake Mining Company, we are contemplating doing some exploration and development in your county in out-of-the-way areas, and if we found anything what would your feeling be about responsible development? We're responsible developers, and we would be bound to not leave a mess and to do it right so that the communities impacted would feel good about it--without saying what we were looking for or where we would be for sure. Just a hypothetical "what if." Basically, as I say, the consensus was that they were reasonable, and if you could convince them that you had a reasonable plan you would get it approved.

That was a very important part of the program at that time because we could have spent another four or five million in exploration up there; I think at that time we had spent a half a million or less--$400,000 comes to mind. We needed to know whether to continue or whether to walk.

Swent: Had you known of any other mining people that had done this kind of thing, going out--

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[1]Raymond Krauss, interview in the McLaughlin Mine/Knoxville District oral history project, Regional Oral History Office, The Bancroft Library, University of California, Berkeley, in process 1997.

[2]See the interview in this volume with Will Baker.

Anderson: Well, I had done it before in my career when I was with Occidental. We had found a zinc deposit, as I told you, in Tennessee, and part of that zinc deposit extended under a city. So we proceeded to talk to the city fathers and acquired leases for zinc rights under their homes. The deposit was a couple thousand feet below the surface, so the homeowners would have never even known that you were there. But we leased--I think we got 99 percent of the lands under the city leased: under city buildings, all the residence areas. I had also done this once before in Arizona, the same thing, under a town. I found a copper deposit that was partially under a town.

Swent: Where was that?

Anderson: In Miami, Arizona. It was under the town of Miami, and we did the same thing there. So I had a lot of experience in those sort of things. Most people don't do it.

Swent: You don't think of that as something that a geologist gets involved in.

Anderson: As I say, my whole view of the world was economic discovery, not just discovery of something you couldn't do anything with, and the whole program was geared on a risk/reward ratio, and the board made the commitments not knowing much about me other than the interviews. I was convinced that I could find economic mines. We ran economic models every time we drilled a hole. We would do metallurgical testing, we would see if that changed the concept, the economics of what could be there, and if the minerals and elements in it were very hazardous or whatever if that would change the project. Every time we drilled a hole we looked at that. We looked at that at least six hundred times at McLaughlin as we explored and developed the deposit. But as you went further and further you knew more about it, so there weren't any real major surprises. We did that on every project for Homestake.

Delays Caused by Vocal Opponents of Mining

Swent: If you had run across your English professor in Yolo County early in the game, what might have happened?

Anderson: It could have had a substantial impact on the decision to go ahead.

Swent: Do you think you might have backed away from it?

Anderson: If it were just him personally, probably not. But if he represented a huge group, and the community leaders felt the same way about it, then I think you would have a problem. If you had two or three eloquent speakers very dedicated against something--but basically if the community was open-minded, it would listen to reason. And that's what we found, even in Yolo, that the leaders and the supervisors or city commissioners or whatever they call them were open-minded, even though this guy was probably not--they didn't know about him either at that time. He tried to raise their hackles, and I remember Ray Krauss telling me every time we went to a meeting this guy would come up and scare the heck out of the leaders. So instead of getting something approved at that meeting after we had done all our research, we would have to have another meeting to have more input from independent consultants and everybody else. Then, at the third meeting you would get the approval. So it delayed every permit by two meetings. Every permit. He was just there for every one. It was a delay. Two hundred permits. Ten million dollars on all the environmental studies and the permitting. But it was worth it, but it was a challenge. But we concluded that you could probably develop a mine, and it turned out that we were right. There was a time frame where we were worried about the change on the board of supervisors in the counties. The most work we had done was in Napa, not realizing that part of the ore body went into Yolo at that time, and secondly that the facilities would be in Lake County. As soon as we saw that we then expanded the--.

Swent: How did you become aware of the Lake County siting?

Anderson: It was very early on, after we had actually drilled the first ten holes and knew we were on to something. We started looking for areas for waste dumps and for tailings disposal, and tailings is always a grave concern environmentally, and this area in Lake County was one of the prime areas for the mill tailings. So we acquired that very early on through options and claim location. [coughs]

Swent: Would you like a glass of water, Jim?

Anderson: No, I'm fine, thank you. That's part of my philosophy of economic discoveries, that you've got to have all the land that you need to run everything. You can't have just the ore body; you've got to have the site for the waste, you've got to have the tailings, you've got to have the mill site for the mill and access and power and everything else.

Swent: That might be one of the things you would list as a new development that affects your exploration: this whole

environmental consideration that you wouldn't have had to think of twenty-five years earlier?

Anderson: Indeed, and I think that became a paramount part of our program. We hired a couple of environmental specialists, the Danny Brothers: Joe Danny, and I forget his brother's name. And we hired a government relations person, Bob Reveles, to help us get professional expertise on those areas concerning our entire program, not just at the McLaughlin property.

So it was a team, and I think it could have happened--Homestake being a small company, everybody understood the risks, and were prepared to take them. Probably many other companies would not have undertaken them because of the major defeats that the oil companies had in northern California in trying to bring refineries in there. And the labor unions.

Key People: Gustafson, Kalk, Previdi, Stoehr

Swent: In addition to just drilling the holes, I presume you had to build up quite a staff then too, didn't you?

Anderson: We added the staff as needed. I think at the outset--as I said, we had contract drillers, so they provided their own people. Don Gustafson had a key project manager because Don was in charge of reconnaissance as well. I don't know if you've talked to him, but his name is Tom Kalk. He was the project manager under Don Gustafson.

Swent: You had mentioned here four managers [looking at document].

Anderson: Right, project managers and reconnaissance managers.

Swent: Gold reconnaissance, target exploration.

Anderson: Right. Don Gustafson started out as reconnaissance manager, and when he found McLaughlin I appointed him to be the target exploration manager. And then he hired a project manager under him because he had several reconnaisance and drilling projects going on at the same time.

Swent: That was Tom Kalk.

Anderson: Tom Kalk, yes. Tom did a lot of the drilling. He was responsible for drilling and plotting the holes on the maps and doing the initial ore reserves.

There was a very important engineer that I hired for the exploration group, a very practical engineer: his name is Bob Previdi. He's a mining engineer, and he's here in Denver. He was instrumental in doing the ore reserve estimates, and a lot of help on the economic modeling and so forth at McLaughlin.

Dick Stoehr and I traveled to South Africa to find out about the autoclaves because we knew there would be several processes to treat this refractory ore, which in this case the gold encapsulated in silica. I'd say I'd give a big part of the credit to Dick for his contacts and knowledge and persistence in following up on autoclave technology which we ran across when we were in South Africa, and he enlisted the service and help of several South African firms. They were thinking about much bigger operations for autoclaves in South Africa, to treat some of the big huge waste dumps they have, and they would use our three-thousand-ton-a-day facility as a pilot plant for their own much bigger one. I mean, Dick did a lot of those things that were very important at that time for that autoclave, because the other alternative was to use a process called the Sherritt Gordon process--they wanted a huge royalty, and it was much more expensive and capital-intensive to build a plant.

Swent: And you are supposed to be aware of all of these options in order to make your recommendation.

Anderson: We had developed a metallurgical process. I hired outside consultants. Langan [Swent] was involved in a lot of those decisions, picking--I think it was a firm in Toronto. I forget their name now. It was a close friend of his, and he had used them in the uranium days.

Swent: Al Ross?

Anderson: Al Ross, that's the one. Absolutely. He was the one who laid out the options that we had, including the Sherritt Gordon, and I think he even probably said that the South Africans he was consulting for were looking into autoclave technology. As I said, after we got the first ten holes I started all these things immediately: the investigations, whether you could permit it, was it metallurgically economic, could you recover it, what are the economics going to look like. Those things were updated almost daily. It takes that to be successful.

Swent: Awfully complicated, isn't it?

Anderson: It was fun.

Swent: It's more than just finding colors in a pan.

Anderson: Exactly. And at the same time, we were exploring other sites and locations.

There were at least two properties with potential comparable to McLaughlin. One's under a town, and another is in a state park which will never be mined. Ever. Well, maybe two hundred years from now, but not now.

Swent: Socially impossible.

Anderson: Yes, socially impossible. So McLaughlin was socially possible.

Swent: Just barely.

Anderson: Yes. Right on the edge. A lot of permitting. I had met Ray Krauss when he was on the [California State] mining board. He had lived in Sonoma and was a county planner in Sonoma, and had been involved in developing a plan for mining sand and gravel. And it was a very good plan and a very reasoned and practical plan, and most of the mining companies went along with it. There was a lot of smoke from some of the environmentalists, but it was approved by Sonoma County. Ray was on the mining board--

Member of California State Mining and Geology Board

Swent: And you were also.

Anderson: And I was on the mining board.

Swent: You might mention that. When did you go on the mining board?

Anderson: I think it's on my résumé, but it was 1977.

Swent: Oh, yes. [Looking at document] This is the California State--

Anderson: California State Mining and Geology Board.

Swent: In 1977 you went on that.

Anderson: Right. I started on the board in 1977 and became chairman a few years later, and I think it was because of the permitting success that we had and also fulfilling the promises that we had to the communities there when we were first starting, I

think Don McLaughlin and Paul Henshaw probably recommended me to be on the mining board. And their recommendation carried a lot of weight in Sacramento. That's how I think I got appointed. It's an appointment--I'm a Republican, and [Governor Edmund G.] "Jerry" Brown appointed me, so I was the token developer, I guess, on the mining board. I eventually became chairman of the board and stayed on the board until 1992, and it just became too much of a burden.

Swent: So that's how you met Ray.

Anderson: Yes, then I hired him. I said, "You have to quit the mining board. We'd like you to come to work at Homestake." He did, and he became the environmental manager, and he knew all the people, of course, having worked in Sonoma and knew a lot of the planners from the other cities and communities. He was a key player, no question about it, in getting that mine permitted. Of course Jack Thompson,[1] with his great ability to communicate with people in those early permitting days--to be able to describe mining to them in terms they understood was very important.

Swent: But he came quite a bit later.

Anderson: Later, but he came during the construction phase when a lot of the operating permits were being applied for, and that's another level of complication. I talked about just permits to get started; then in addition you needed permits to operate [chuckles]--like blasting permits and rock-moving permits and hauling permits across roads and transporting hazardous material like cyanide and stuff across roads in the state.

Determining Economic Feasibility

Swent: Now whose bailiwick was that? Did that come under the geological--

Anderson: Until the board approved the construction, its feasibility, and allocated the money, it was my responsibility. All of it.

Swent: How did you--

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[1]Jack Thompson, interview in the McLaughlin Mine/Knoxville District oral history project, Regional Oral History Office, The Bancroft Library, University of California, Berkeley, in process 1997.

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Swent: When you went to actually get authorization to go ahead, was that--

Anderson: Oh, well, the board already was so intimately knowledgeable about it--we would give them updates monthly, and they would see our economic models as we would do updated ore reserves officially once every quarter, probably.

Swent: So that wasn't a big dramatic thing.

Anderson: It wasn't unknown to them, and the main questions of the board, I think, were, What's the price of gold going to be? And, technically, is it there? I think Don McLaughlin visited a number of times because his name was being applied to the mine; he didn't want it to be a failure. My studies showed that out of ten properties that start up, eight of them are failures after they've started up. That's another factor in the risk that a lot of people don't know; they think that once you start a mine it's going to go, but a lot of them fail. We knew all those things, and all those things were discussed at the board level. I think it was a board meeting or two before the feasibility study was approved and submitted. Don McLaughlin endorsed having his name put on the property, so I think that really sort of helped with the rest of it. But it was a big investment for Homestake in those days. It started out to be about--I think the budget was $180 million or $190 million. I think it turned out to be $250 million by the time we were through. It's a lot of money. Fortunately, we had the cash, didn't have to borrow it. I think Homestake had a million ounces of gold in the vaults at Lead in the days when they were worried about production commitments to people; if there would be a mine cave-in or a shaft cave-in or something, they needed production so they had a million ounces in the vault, and I think we sold a good part of that at $800 or $700 an ounce. So it financed the McLaughlin Mine, in effect.

Swent: There were a lot of management changes at Homestake at that time and the way they were doing things. I remember that you had retreats for your staff, and--

Anderson: Yes, for the exploration group we had our own annual budgeting session, and those were opportunities to talk about programs and progress and knowledge that had been learned by various exploration teams. We would meet in Reno or Denver and share knowledge about these concepts. We were doing lots of things, there were new staff members, and they had to be brought up to the date.

Getting Reliable Assays a Challenge

Anderson: We found that the assay labs would not handle the samples the way we needed them to be done, because gold assaying depends on the coarseness of the gold and how fine you have to crush the sample before you even take a split. And most of the commercial assay labs will crush the rock to minus ¼ inch and then take a sample. Well, we found that the size that you have to crush to before you take the first sample depends on the coarseness of gold in the rock, and sometimes you have to grind it to 100 mesh before taking a split for assaying. We would do very thorough metallurgical and assay studies to find out what the size of the gold was. The first time we would hit an ore hole on a property, of ore grade, we would do all those studies to find out the coarseness of the gold and the metallurgical characteristics and so forth. We would then tell the assay lab what size we needed to crush the rock to before they took the split for assay. We found that our samples were always in the storage area for weeks or sometimes months, because they would do the standard ones first; they didn't have time or the interest in doing this special processing. So we built a sample preparation lab in Reno, and that was part of the growth. That lab would prepare all the samples, and then send [them] out to assay labs for assay, but we would prepare all the samples meticulously. With each group of a hundred samples sent to an assay lab, we would send five to ten of what we called standard samples. We put together large volumes of material that would run .01, .1, .3, and send those with codes only we knew--and if the assay lab didn't come out with the same answer on those unknown samples then they would do the whole batch over again, and we knew there was a problem if they didn't get the right answer on those samples. We did that on every batch of samples from every prospect.

Swent: You would send them to several different labs?

Anderson: As well. But we would send our standards; if the lab that we sent them to didn't get the right answer on the standards, our agreement with them was that they would have to do them over. And they didn't know which samples were standards and which ones were just the regular. So that was a very sophisticated part of the program. It gave us the confidence that the assays that we had were correct, that the reserves were there, and to me that's the battle: if you don't have reliable assays you might as well forget the whole project. If you need to spend $200 million to build a mine--and we knew early on it was going to be over $100 million, and by the time it was finished [it was] $180 to $200 million with the size that we were going for.

Swent: If only the price of gold had stayed up to six hundred.

Anderson: Well, that's right--if it had stayed at six hundred it would have been a smashing success. But I think in part a lot of companies started exploring for gold, and you'll see that in my paper here that every one of these things is time sensitive, just like copper. In my days of copper--when I was really focusing on copper with Kennecott--once there were so many copper deposits found the copper price started dropping--because somebody wanted to put their new deposit into production and they could undercut the price a bit and still make money. That happened in gold, and I think now what's happening is every time gold reaches approximately $400 an ounce everybody sells forward, and all the producers--except Homestake and a couple others--bring it back down. So it's ranged from $375 to $395 for the last five years, and in part producers do that to themselves by selling forward to lock in a price at $400 or thereabouts.

The business changed with time. Now is not the time to start an exploration program for gold; it's the time to explore for something else, some other metal or some other commodity. But at the time I joined Homestake gold was very much in my mind as being the opportune element and the opportune company and--.

Swent: Oh, you hit it at the right time.

Anderson: It sure was.

Moving a Project from Exploration to Operations: Before Development or After?

Swent: I wanted to talk a little bit, if you don't mind, about--I think it's a critical point, and I'm unclear about it myself. When your exploration group turns a project over to the operations people, how do you know when that--how does that happen? Would you like to discuss how the McLaughlin Mine--

Anderson: To me it's very simple; it's not grey. A lot of people probably believe it's grey, but I think once you have a feasibility study that's been prepared by an outside independent group and verified by your internal organization--

Swent: You ordered the feasibility study, did you?

Anderson: Exactly. We did it inside but we also had some outsiders look at it, but that was the exploration group. And then we turned the data over to Bill Humphrey's[1] group. And Don Delicate (while he was still active in the company), every time he came to a board meeting he would spend two or three days with me. We would go up to McLaughlin. So we always had his input, almost every month--a couple days of his input as to whether there were problems he could see or whether these assumptions were wrong. For many years after he retired, I used him as a consultant in the exploration group to help because he was a very practical guy who had no axes to grind, and he just really knew the sort of rule-of-thumb assumptions that you could make and be very close for operating costs and labor and permitting and everything else.

To me, once you've completed the feasibility study and knew you had a reserve that would make it on the maps for Homestake, which was a couple hundred thousand ounces a year--it would be about the size or bigger--it would grow hopefully to the size of the Homestake Mine. We started out with a couple hundred thousand ounces per year, and then we did a feasibility at that size and turned it over to operations, they looked at it and concurred with the numbers and thought they could do it. At that point in time the feasibility study was submitted to the board.

Now there's a lot of concern, I think, in a lot of groups as to whether the exploration group ought to do development--which we did. We did the development work. I think that's essential, myself. It's critical that the people that are doing the exploration and know the most about the deposit have within their group the capabilities--not necessarily the same people, but within their group--of doing the evaluation. It's so important; you want to stop it immediately if something along the way shows up as being bad, not at the last minute when you're ready to think about spending $200 million. But I'm thinking about going from 400,000 to 600,000, from 600,000 to a million, from a million to two.

Swent: What were some of these junctions at which point you might have stopped or had to consider whether or not to go on?

Anderson: There was a very clear one after the first maybe $400,000 and thirty or forty drill holes. What does that show us? Is it

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[1]William A. Humphrey, Mining Operations and Engineering Executive for Anaconda, Newmont, Homestake, 1950 to 1995, Regional Oral History Office, The Bancroft Library, University of California, Berkeley, 1996.

economic for the reserves we have? Can we permit it? What is the capital cost going to be and the operating cost? Is it going to be profitable? We would do that almost on a drill-hole-by-drill-hole basis in the early days, from drill-hole thirty up to drill-hole 100, and after that it would maybe be once a month that we would see if the next thirty holes had improved, because we were extending--we had already had a core of reserves, and we were trying to expand them, and we already knew the core of reserves was profitable, but not maybe the size that Homestake would like. So the question is, Do we continue? Is there a good enough chance to make it something big enough to be of interest to Homestake versus just selling it as a joint venture? At this point those were the main considerations.

Swent: So that could have been a possibility.

Anderson: Exactly. And it was, even up to probably a few days before the board decision. Several people in Homestake wanted to sell the property.

Swent: How did you feel about that?

Anderson: The story is sort of like this: each day I would hear some negatives of why we shouldn't do it and why we should sell it, and I would go home and spend the whole night--and I did this for about ten days, thinking of the positives to counter with--and the next day discuss those and then I'd hear the negatives again, and that kept on going for ten days, and finally the decision was to go ahead and submit the project to the board for approval of development and operation by Homestake. I think that was Paul Henshaw's decision.

Swent: To go ahead?

Anderson: Yes. But he was--listening to both sides, devil's advocate, if you would, and I think that's the way it should be done. Here's the pros, here's the cons. Every project is a risk, particularly for Homestake, with a $200-million investment. It would break the company if it wasn't reasonable. I think Paul handled that process very well, though it was hard on the player--me [laughs]. So I didn't sleep much for ten days.

Swent: You get sort of a proprietary interest in it, don't you?

Anderson: You think you're trying to be objective, and I was convinced the reserves were there. I mean, clearly the big risk in my opinion--and probably in most people's--was the price of gold.

That's a bet the gold company probably has to make if it's reasonable.

Swent: It's anybody's guess.

Anderson: If gold would have stayed at $600, it would have been a fabulous project. At the time we were doing the feasibility study, gold was $650 to $700 an ounce.

Swent: Were you the one who picked a price for the feasibility study to be based on?

Anderson: We picked, I think, three prices: we had a $400 gold pit, a $500 gold pit, and a $600 gold pit.

Swent: Did you personally select that price?

Anderson: After talking with a lot of the people in Homestake, we thought 600 would be a high end, and 400 would a low end. Unfortunately, it was more like 350 as the low end, not 400. Those numbers were discussed with marketing people and with Paul and Don [McLaughlin]. We tried to cover the range--if gold is $400 an ounce, does it make sense to go ahead? Well, it was very marginal. And if you have any loss of recovery, which they apparently didn't, but if you have operating costs or higher capital costs, it changes the economic results.

Swent: Well, it turned out to be a wonderful thing.

Anderson: I hope so. I hope Homestake's happy with it.

Swent: How do you feel looking back on it?

Anderson: Oh, I think it was one of the more exciting and stimulating parts of my career.

Swent: When did you leave Homestake?

Anderson: In 1987.

Swent: In '87. So it was well on the way by then.

Anderson: It had been in production for four or five years by then.

Swent: So you knew how it was going to turn out. Is there anything else that we need to say about McLaughlin, do you think? I don't want to leave out any of the major--

Anderson: No. I'd say if you've talked to Don Gustafson, you've talked to Ray Krauss, Jack Thompson--you should talk to Bob Previdi if you have a chance. He's here in Denver, he's a mining engineer. He was quite instrumental in the engineering aspects of the feasibility study.

Swent: I came up to Denver last year to interview John Ransone, but he died before I got here.

Anderson: He was instrumental in the metallurgical end, and so was a fellow by the name of Doug Halbe. He was Ransone's boss for a while, and then I think Ransone got transferred to McLaughlin.

Swent: Ransone was the project manager.

Anderson: He became project manager, but not at the start.

Swent: No. I really felt quite crushed by not being able to interview him. I have not talked to Previdi.

Anderson: I think he was a key player. He's probably got some perspectives about the risks, and he's coming from the engineering standpoint. He was very instrumental in all the engineering and ore reserve calculations, and I relied on him to work with the metallurgists to come up with the economics there. He lived here in Denver. It was a teamwork effort; lots of players, and all dedicated to try to figure out whether the assumptions were reasonable. I think probably the assumption that was off the worst--from about the time I left--was the fact that probably the infrastructure, the roads and stuff, cost more than people had expected. I think the county demanded the road be paved rather than just a nice gravel road, and it had to be built to highway specs in terms of width and such, so it was no longer just a little quiet county road.

Swent: That must have added a lot.

Anderson: It probably did, I'm not sure. I don't remember, but it was probably a couple million dollars.

Swent: Of course the whole environmental permitting, I think, took longer than anybody realized it would.

Anderson: It sure did. It was just three delays for every permit--this guy from Yolo County.

Swent: Hard on everyone [chuckles].

Anderson: I think that pretty well covers it. It was a wonderful experience. I think the Homestake team was exciting to work with. I finally left because I had an opportunity to run a company. We put together three or four developments together with an operating mine and built them up in a short period of time. After that, the environmentalists became more successful at delaying projects, and I decided after that success that I didn't need to spend another eight years of my life trying to get another mine permitted in the United States.

Swent: Were you doing a similar kind of thing with the companies you've been with since then? Have you been able to continue the--

Anderson: We didn't have much exploration. We had mostly development, feasibility and financing and startup, more the operating end of it. We put together an operating company with three development projects and a couple joint ventures that we bought into to form a stand-alone company, which was sort of like starting a Homestake.

VI OTHER VENTURES

Minven: CEO also Means "Chief Environmental Officer"

Swent: Which one is this? Fulcrum? Or Minven?

Anderson: Minven is the company that I really started. There were assets that Fulcrum had purchased, and I put them all together and started the company and developed three mines and participated with joint venture partners on two other ones that were put into production and were successfully profitable mines.

It was exciting--sort of the operating end of things and getting to talk to financial people around the world. I met a lot of exciting people all over the world: shareholders and bankers and investment bankers and lawyers.

Swent: Geology certainly covers a lot more than just looking at rocks and especially in your experience.

Anderson: Depends on the person, I think. Some geologists are only interested in the rocks. And I was only interested in economic result. That was my pure interest.

Swent: And that gets you off into a lot of other areas, doesn't it?

Anderson: Exactly, yes.

Swent: Personnel and economics and--

Anderson: Environmental.

Swent: Yes.

Anderson: I remember when I was with Minven, I used to tell particularly the governor of South Dakota--I was CEO, and I said, "Do you know what that means?" He said, "Yes, chief executive

officer." I said, "Yes, I'm that, but I'm also chief environmental officer." And I think that <u>is</u> the role of the CEO these days; he has to be the chief environmental officer as well. That's probably just as important as having the confidence of the shareholders, to be a very reputable and credible environmentalist. And it costs money, unfortunately.

More About the California Mining and Geology Board

Swent: Would you like to talk at all about your work on the California Mining and Geology Board?

Anderson: It's responsible for the Surface Mining and Reclamation Act [SMARA] and also responsible for geological studies throughout the state, both from the standpoint of resources and from the standpoint of environmental and from the standpoint of public safety. The new areas that I really found fascinating and critical involved public safety--particularly landslides, seismic hazards, and areas prone to flooding.

Swent: Do you have any real clout or are you just advisory?

Anderson: It's an advisory board.

Swent: Do you have any leverage you can use?

Anderson: The only leverage you have is to convince the governor or a senator that this is a practical program and that it should be followed. And we had several outstanding successes in that regard, in that miners typically--particularly in the southern California desert--have some real problems with urban sprawl. You have a mine out in the middle of the mountains or the foothills, then all of a sudden the city is encroaching--people are starting to build houses. It's sort of like the Stapleton Airport and the noise problem in Denver. People start objecting to the mines.

We got some important things implemented. One was that we developed an inventory system that would be done by the state and accredited by the state, and if there were mineable reserves in an area, it would have a certain designation--MRZ3, mineral resource zone three, which meant there were economic reserves and that this area also had some additional potential. Potential ground would be designated an MRZ-2 area, and that whole area would be known as a mineral resource zone area, and it would be plotted on all the county maps in every county.

And when a developer or a land owner came in to buy a parcel to develop they would be confronted with the knowledge that there were mineral resources and developments in the area.

Swent: Oh, so they couldn't claim later--

Anderson: --that they didn't know about it. Most counties adopted that criteria as part of the SMARA, the Surface Mining and Reclamation Act, and incorporated it. I think that was a wonderful thing for the public as well as for resource developers, to sort of say, Hey, here's an area that has substantial resources for the people--and a lot of these were sand and gravel deposits--you can't move the sand and gravel very far; the freight costs too much. For example, Bakersfield or Fresno or Barstow, Palm Springs, have very significant needs for sand and gravel. And they all have proven reserves and permitted reserves, but usually the permitted reserves are not the size of the proven reserves or the needs of the community. Areas with potential reserves were delineated on the maps as a mineral resource zone; therefore when people were contemplating and conducting residential or commercial development they wouldn't be surprised and legally wouldn't have a case to fight an application for a mining operation.

So that was one of the achievements, I think, that was a balance between public use and development use that I thought would stop a lot of controversy and fights. One area of public safety that I continue to be frustrated about and never had any real impact on was the fact that people build in flood plains or in landslide areas. You have the flood or you have the landslide, the government loans them money at a very cheap interest to go back and rebuild in the same area, only to have the same flood or landslide happen again. My feeling is that most of these areas have been mapped very well now. The board implemented a ten-year program to identify landslide and earthquake hazard areas, and this work has been completed for most urban areas. They are also recorded on county maps. At the very least, I think somebody should be stopped from building a new building in these extremely hazardous areas, and secondly--if possible--if they have damage to existing improvements, give them a low-cost loan to build elsewhere and not in the site of the same devastation as before. But that's almost impossible to do because the land values are already there, and you're disrupting somebody's land values in the area if they are excluded from low-cost government loans. My idea was that if somebody wanted to go back and build there, they acknowledge that they are in a hazardous area and be prepared to take the risk. Then it's their property value that's at risk and not the public responsibility to provide low-cost

loans to rebuild. You have, unfortunately, so many areas that are already built over, but if this approach is applied to new expanding areas like the areas in the southeastern desert particularly: Barstow, Bakersfield, Fresno, all those areas, you could do some really good geologic planning ahead of time.

So that was an exciting part; I got to see a lot of the state and expand into new areas of public concern and involvement, and I met with just about every environmentalist in the state of California personally in various meetings. That was real stimulating in that it created knowledge and rapport and credibility with people that you know and find that you can talk to them and make sense and have a discourse that has productive results.

The California Desert Conservation Area

Swent: Were you involved at all in the desert protection act?

Anderson: Oh, sure.

Swent: What was the state board's role in that?

Anderson: The state board's role in that particular case was to advise the governor. The governor's office had the only authority in the state--other than the two senators and the congressmen--to go back to the politicians in Washington and make a statement about values and how the state felt about either excluding or developing the southwest desert. The large CDCA--California Desert Conservation Area--was on the dockets for many years, and we inventoried all the known mine prospects and potential areas that were known at the time. We also did a lot of geological mapping and resource mapping, to indicate areas for potential future mines. We published all that information and made it available to the governor's commission that studied it. We put together a set of maps that identify the impact on known and potential new resource areas, and I think it changed the configuration of the areas that were withdrawn, significantly.

##

Swent: So you did have a significant role; I didn't realize that.

Anderson: We advised the governor, and in this case it was Governor [George] Deukmejian, and Governor [Pete] Wilson too. I think both governors were rather reluctant to take a strong vocal

opinion in public about development, but I think deep down they felt that there should be reasonableness about it and did everything they could to try to influence the outcome in a manner that would certainly recognize the major mineral areas. I'm sure there have been some important mineral areas that for whatever reasons have been withdrawn and it will take an act of Congress before these areas can be considered for their mineral resources. But I think we saved a number of areas for multiple use and future consideration.

Swent: How did you feel about the final result?

Anderson: I don't think the final result is all in yet.

Swent: Well, they're still fighting about it, yes.

Anderson: I've been away from it a couple years now, but I think it was still excessive--withdrawal. I think that exploration should be allowed in the withdrawn areas, and if a very viable deposit is proven and the development plans provide reasonable, prudent safeguards to the environment, it should be allowed to proceed. Right now in these areas, you don't even know if there's a resource there for sure because you can't even get in to look.

Swent: Can't explore.

Anderson: Exactly. The exploration process doesn't do much land damage, particularly if you do it properly these days. You don't have to take a bulldozer out and scrape up hundreds of miles of turf to know what's there. To some extent these withdrawals represent an effort to withdraw as much land as possible, without consideration of multiple use. And on the other hand, I think some small parts of this land should be withdrawn--I mean, certainly Yosemite Park and Mono Lake and very select other places have outstanding beauty and development should be preserved, but there are other areas that are sort of gray. Let's leave them open to consideration as time goes on. And I feel the same way about the federal government withdrawal of most of Alaska from exploration which was accomplished by signature of President Carter on his last day in office. That was not a future look to the welfare of the country; it was more of a selfish, "Let's withdraw as much as we can before we leave" sort of approach. If you read a book titled Stones of Destiny,[1] I think it becomes very clear that those sort of acts seal your destiny if you can't reverse them. Once a major

---

[1]by John Ross, Michigan Technological University, Houghton, Michigan, 1975.

decision like that has been made, it takes an act of Congress to overturn them.

The Summitville Disaster

Swent: Yes, it's awfully hard to change it.

Anderson: I'm for balanced use. I think we have to be concerned--I'm a geologist, and most geologists are concerned about the environment. I think the safeguards are there; there are some very bad actors. I think those actors ought to be banned from getting mining permits. I have talked to several industry leaders about really one major environmental disaster here in Colorado called Summitville. Now that same owner has had environmental disasters elsewhere.

Swent: Fortunately cyanide does degrade; it isn't as bad as mercury.

Anderson: Yes, but it takes so long. But that's right.

I think there is little public tolerance of a trace amount of cyanide--people don't understand it. They're scared; it's a panic. Any at all is bad. It's interesting--I think it was Dick Stoehr that pointed this out to me that there's a lot of double standards around. For example, the selenium content of uranium tailings. There was also a big concern with selenium in central California--

Swent: With the birds at Kesterson.

Anderson: Yes. The regulations on mining are very strict for selenium. You could have a thimble full of selenium sulfate in a body of water the size of Lake Tahoe, and it would be too much. Now let me tell you what you can do tonight: you can go down to the grocery store and buy a hair shampoo called Selsun Blue, which is 50 percent selenium sulfate. You rub it in your hair, you get it in your eyes and your pores--

Swent: I've had it recommended to me by the dermatologist.

Anderson: It's 50 percent selenium sulfate, which means it's 25 percent selenium. You can buy it in the grocery store, but you can't put a thimble full of it in a lake the size of Lake Tahoe if it's a mining project. So there's some very directed focus about how to use environmental laws.

Swent: Well, a lot of people just don't like mining.

Anderson: And the other thing is--and I've read an interesting article that was in a newspaper called Investor's Business Daily. It said that if the government provides research support in the form of dollars, the federal government then has the option to pick and choose the data from the results of that scientific research to fit their desires for regulation or policy. In effect, they can warp the scientific method to fit their needs.

Swent: That's the risk in funded research always.

Anderson: I think so, because the funder wants to be able to do something with it. It's a federal law, not just the way it's done. It's a federal law. And I think the scientific method should not be, shall we say, twisted. I think the facts ought to be there, and then you make clear what the facts are, and here's our interpretation or here's what we think is right for the public--fine. Let's distinguish between what we're concluding and what the facts really suggest. It's like the ozone layer and global warming. That's still a big issue obviously. But the scientific evidence isn't conclusive. But the interpretations are that it's very conclusive. That's enough on those subjects.

Swent: Are you involved in any political or advisory work right now or have you done anything here in Colorado like that?

Anderson: No.

Swent: Mining Congress, which is now the National Mining Association?

Anderson: No, I'm not involved. There isn't much mining in Colorado; there's not that much activity here. I think if I were in California, I would be.

The Importance of Sand and Gravel Mining

Swent: Sand and gravel. You mentioned sand and gravel, and I'm becoming aware that that's where the real frontier is now, isn't it?

Anderson: Absolutely. Gold was the frontier in the U.S. when I joined Homestake, and I think non-metallics--particularly sand and gravel and some clays that are used for environmental control, to stop leaking of hazardous materials, are now on the frontier

in the U.S. There's a great opportunity there to do environmental good and also to further society.

Swent: Nobody wants a quarry.

Anderson: No, that's right.

Swent: But we all want concrete.

Anderson: That's right [laughter].

Swent: That, I think, is where the big battles are coming. Well, they're already happening.

Anderson: There was a very interesting example in Los Angeles County, near the outskirts of Los Angeles County. Interstate 5 goes over the area; it's just south of the Ventura turnoff. There's a beautiful setting there if you come up the long grade, and on both sides of I-5 were major sand and gravel operations. They probably mined millions of tons a year for decades out of these two properties and made a profit--probably of a couple dollars a ton for the sand and gravel. When I was on the board we reviewed that area. It had just been approved--the two remaining sites left in Los Angeles County--to dump Class I waste. Class I waste contains no organics; it's concrete, metal, things like that, but no garbage: no paper, no tires, nothing like that. We visited the site, and the operators were charging thirty dollars a ton to deposit the waste in these holes. That was ten times more than they made from the sand and gravel mining. The operation consisted of a scale with a weigher, a manager to tell you where to dump it, and a bulldozer with an operator in the bottom of it moving the stuff around five days a week. And they made ten times more than the miner. Eventually it's going to be developed as a commercial and a residential area, including a golf course. The area west of I-5 is already a golf course and residential area, and this other area will probably be sold for millions of dollars for subdivisions once it's all compacted and engineered. That's how valuable landfill areas are in California. So not just having sand and gravel to mine, but once it's mined you've got a hole that you can put these materials in. A fabulous opportunity if people would just think of it that way.

Swent: It would solve a couple of problems.

Anderson: It would solve a couple of problems. I hate to see--I go to San Diego quite often--and I see these barges going out to sea with garbage on them. They're just going out twenty miles or whatever and dumping it--the same in San Francisco. They just

go out to the Continental Shelf and dump the stuff. Much better to bury it and encapsulate it.

Swent: Yes. And it can be compacted enough to build on.

Anderson: Exactly. Well, look at Foster City [California].

Swent: Is that what that is?

Anderson: It wasn't a waste dump, but it was an engineered landfill. During the earthquake there was very little damage there as compared to, say, the old Marina area in San Francisco. And the Marina area was landfill all right, but it wasn't an engineered landfill; it was landfill from the destruction of the 1906 earthquake. They just dumped it in and graded over and built on it. It wasn't compacted and engineered. But compacted and engineered landfill, once it's settled and really been around for ten years, is a great building site. In San Diego, if you go on the freeway that goes east-west into San Diego, you go past the big baseball and football stadium, and on both sides there are major high-rises and malls and everything else. Most of that area is engineered landfill from sand and gravel operations in San Diego County. It's beautiful. I mean, you can restore things to a much better and higher value than they were when you started if you let the mining occur in the first place.

But there's not going to be another generation of ghost towns [chuckles] for maybe fifty or a hundred years in the U.S.; maybe the cycle takes that long to come back. They'll probably go to Iran and mine there before they come back here [chuckles] to develop new mines; existing ones is different.

So we can turn the tape off now. Maybe that's enough.

Swent: Thank you, Jim.

Anderson: You're welcome.

Transcribed by Gary Varney
Final Typed by Shannon Page

Regional Oral History Office
The Bancroft Library

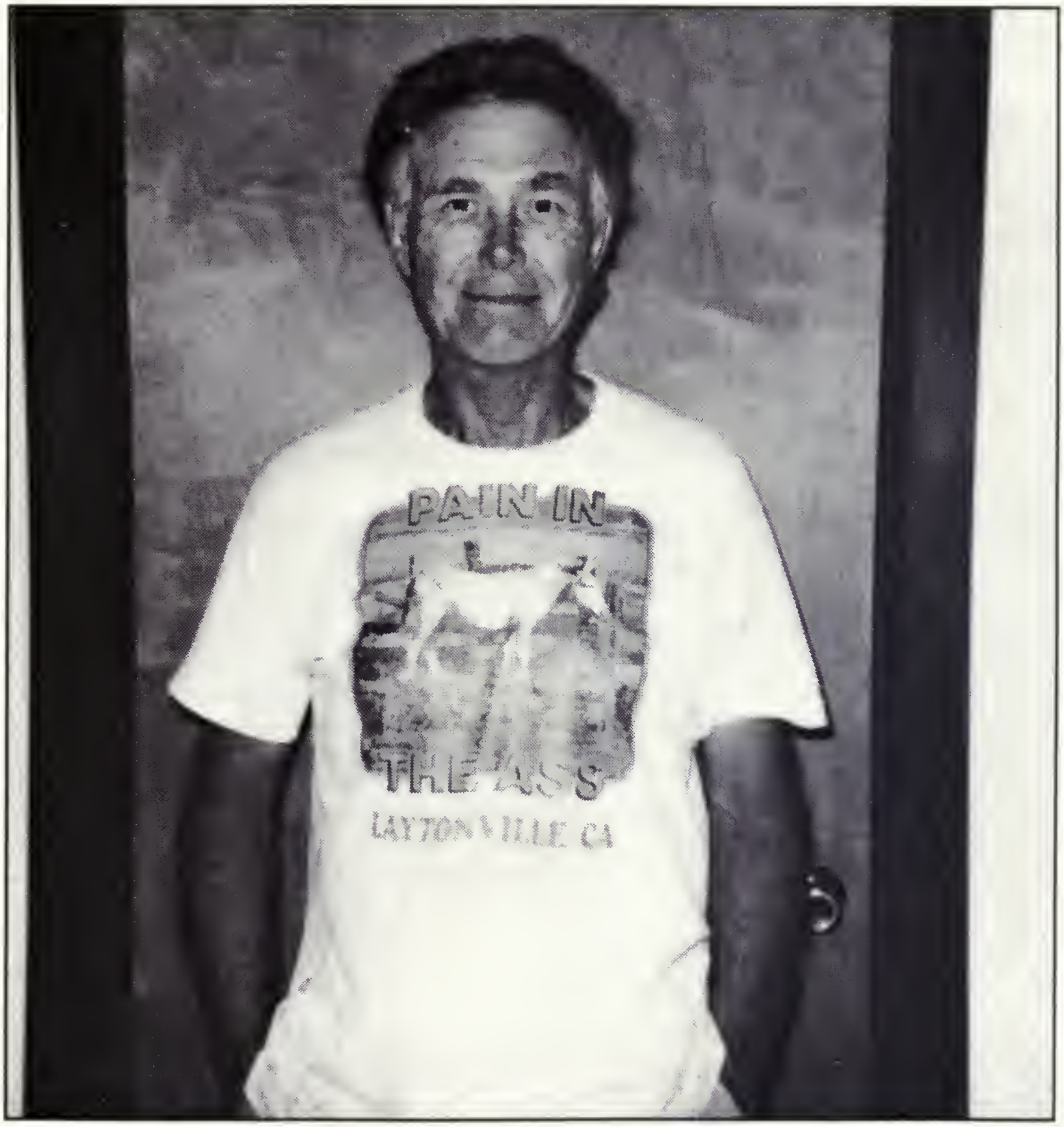
University of California
Berkeley, California

Western Mining in the Twentieth Century Series
Knoxville/McLaughlin Project

Will Baker

CITIZEN ACTIVIST

Interview conducted by
Eleanor Swent
in 1994



Will Baker, 1997.

INTERVIEW WITH WILL BAKER

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INTERVIEW HISTORY--Will Baker

Professor Will Baker of the Department of English, UC Davis, was an articulate opponent to the development of the McLaughlin Mine. I telephoned to him in the spring of 1994 and asked whether he would be willing to grant an interview, and he readily consented. The invitation letter sent in June 1994 was promptly answered. He came to The Bancroft Library on 8 August 1994 and I interviewed him for two hours there.

Professor Baker came to the interview dressed the part of poet and establishment gadfly: his long hair in a ponytail, and wearing a handwoven Guatemalan shirt. He was born in 1935 in Idaho, began his education at the College of Idaho as a chemistry major, and then went on to study English at the University of Washington, at the Sorbonne in Paris, and at the University of Hawaii. He worked for a time as a member of the crew of an oil tanker. He was at the University of California at Berkeley as a graduate student of English from 1960 to 1964. After receiving his Ph.D. degree, he taught first at Reed College in Oregon, and since 1969 has taught at Davis. He also owns and operates an almond farm in the Capay Valley on Cache Creek about forty miles from Davis.

In his interview, Professor Baker recalls organizing community activism to oppose the mine, and evaluates the results of those efforts. His opposition to the McLaughlin Mine is still firm, principled, and willingly expressed. He maintains that the mine as it developed had environmental effects that were less harmful because of pressure brought to bear on Homestake by his constituency. He does not take himself too seriously, however; the note accompanying his photo for this volume says, "I didn't even change my shirt (I was knocking almonds that a.m.), but the logo [pain in the ass] might be an appropriate reflection of how Homestake viewed our Silly Seven!" The complicated and costly process of permitting the McLaughlin Mine gave full play to the democratic system, in which voices such as Will Baker's are heard.

The tapes were transcribed in the Regional Oral History Office, lightly edited, and sent to Professor Baker in April 1997 for review. He made several minor clarifications of diction and returned the transcript promptly. The manuscript was corrected and indexed at our office. The tapes are deposited in The Bancroft Library and are available for study.

The Will Baker interview is one of more than forty interviews which were conducted by the Regional Oral History Office from 1993-1997 in order to document the development of the McLaughlin gold mine in the Knoxville District of Lake, Napa, and Yolo Counties, California, from 1978-1996, as part of the ongoing oral history series devoted to Western Mining in the Twentieth Century. The Regional Oral History Office was established in 1954 to record the lives of persons who have contributed significantly to the history of California and the West. The office is a division of The Bancroft Library and is under the direction of Willa K. Baum.

Eleanor Swent, Project Director, Research Interviewer/Editor
September 1997

Regional Oral History Office
Room 486 The Bancroft Library

University of California
Berkeley, California 94720

BIOGRAPHICAL INFORMATION

(Please write clearly. Use black ink.)

Your full name William E. (Edwin) Baker

Date of birth May 10, 1935 Birthplace Council, Idaho

Father's full name Waldo E. Baker

Occupation Logger Birthplace Jackson Hole, Wyoming

Mother's full name Bessie Mae Savage (Baker)

Occupation Teacher Birthplace Cocksville, Wisconsin

Your spouse Malinda Penn (Baker)

Occupation weaver/bookkeeper Birthplace

Your children Willa Blythe Baker (31), Dylan Cole Baker (9), Montana Bess Baker (6)

Where did you grow up? Idaho

Present community Guinda-Rumsey, CA

Education B.A., M.A., PhD (English)

Occupation(s) Writer, farmer

Areas of expertise Victorian + Modern Literature, Cinema, Anthropology

Other interests or activities music, natural history.

Organizations in which you are active Rumsey Improvement Club, AWP.

I EARLY YEARS, 1935-1970

[Date of Interview: August 9, 1994] ##[1]

Education in Idaho, Washington, Paris, Hawaii

Swent: This is Eleanor Swent conducting an interview with Professor Will Baker in Berkeley, California, on August 9, 1994. We're going to discuss the development of the McLaughlin Mine.

Before we get to the mine, Will, I want to just place you in context. If you could tell us about some of your background, where you were born and when, and how you came to the stance that you had at the time that this all began in 1981 or so.

Baker: I was born in Council, Idaho, in 1935 and raised mostly there. I went to school at the University of Washington, and then went to school in Paris for a year and then came back and moved to California.

Swent: What was your field of study?

Baker: I was an English major. I was a chemistry major for two years and then switched to English, under the influence of a teacher.

Swent: Would you like to name the teacher?

Baker: Yes. His name was Frank O'Hara. He was a University of Chicago John Hay Whitney professor. They took retired professors from big universities and sent them around to little podunk colleges, of which the College of Idaho was one. He was a very inspiring and interesting teacher. He taught a writing class, and that was the first writing I had done. So I got hooked on it.

[1]## This symbol indicates that a tape or tape segment has begun or ended. A guide to the tapes follows the transcripts.

Swent: And where is the College of Idaho?

Baker: It's in Caldwell, Idaho.

Swent: Did you go four years there?

Baker: No, just two, and then I went to the University of Washington. I got out of there and went to the Sorbonne because I had picked up French by that time. I liked languages.

I came back and started graduate school at Washington, and after a year I went on to Hawaii and got an M.A. [Master of Arts] there.

Swent: What time period are we talking about now?

Baker: That would be '56 through '60, I think. I worked my way back from Europe on an oil tanker, and I wanted to do that some more--it was good money--but my shipmates didn't want to encourage me in a sailor's life. So I ended up going back to Washington for a year, and then I got a teaching assistantship in Hawaii. I spent two years there. And then in 1960 I met my first wife there in Hawaii, and we came back to California and started graduate school. She was in zoology and I was in English.

Graduate Student in Berkeley, 1960-1964

Swent: And where did you do that?

Baker: In Berkeley.

Swent: I see. And this was 1960?

Baker: Yes, '60 to '64.

Swent: Exciting times to be in Berkeley.

Baker: Well, it was just before things got exciting. The spring I got out was the spring before the free speech business and Vietnam--

Swent: But there must have been some ferment all the same.

Baker: There were some signs. I dismissed them at the time, but I can see now they were real signs.

Swent: Can you recall any?

Baker: Robert Scheer gave a speech one noon about what was going on in Vietnam. This must have been '62 or '63, so it was very early in the U.S. involvement there under Kennedy--he sent some so-called "advisors." There was a Catholic connection; the country was then being run basically by the disciples of the French Catholics who had it as a colony.

Swent: This is Vietnam you're talking about.

Baker: Oh, yes. So he gave a speech that was a very flat-footed, straightforward reading of the facts, and it was fairly astonishing and appalling. I remember thinking there was a rather large number of people there, and I had never heard of Vietnam, so it was all new information to me. But within two years, of course, there were several thousand people out there raising a ruckus.

Swent: In Hawaii you hadn't thought much about Southeast Asia?

Baker: No. We had some exchange students at the East-West Center, and some of them were Thai and Vietnamese--and the Vietnamese, I remember, were very well-educated Mandarins from the wealthy classes. Things began to fall into place in the sixties for me, like everyone else, although I was by that time a young candidate for a job. I was close enough to the student population to absorb the spirit of that time. I taught at Reed, which also had a reputation for activism.

Teacher at Reed College, Filmmaker, 1964-1969

Swent: You've been at a lot of good colleges. You did your doctorate, then, here at Berkeley?

Baker: Yes. My first job was at Reed.

Swent: And what was your field?

Baker: English.

Swent: What was your dissertation topic?

Baker: I worked under Jo Miles, and it was the syntax of poetry that I undertook to study--between 1870 and 1930. Eventually got a book

out of it; she taught me how to do research and how to put things sagaciously and economically.

I went through change at Reed, and got interested in film. I finished off the first marriage, came back to California to teach at [University of California at] Davis, and I basically stayed there. I was looking for a place in the country, so I scouted out the Capay Valley and I liked what I saw.

English Teacher at Davis from 1969

Swent: When was it that you came to Davis and the Capay Valley?

Baker: I started teaching there in 1969, in the fall.

Swent: You were thirty-five at that point?

Baker: Yes. I lived in Vallejo first, and then I lived in Berkeley. I lived briefly in San Francisco.

Swent: And drove up to Davis?

Baker: Yes. A lot of people did. There was a carpool. But I figured out that I--at the time I was trying to be a filmmaker; that's what I thought I wanted to do. So I was making experimental films, and it helps to be in a city for that. After a certain number of years--I'm a slow learner--I figured out that it was an expensive high-pressure hustle to make films. I was really interested in the imaginative part of conceiving them, so I should stick to writing. I started to write fiction at that point, but I had figured out that I basically am not a city type. And I spent quite a bit of time looking, and Capay Valley was close enough to Davis.

Swent: How far is it?

Baker: It's about an hour. It's forty miles. Well, from one end of the valley it's only a half hour--twenty-five miles--but from the other end it's an hour.

Swent: You're at the upper end. You live at Rumsey, which is on Cache Creek and about forty miles northwest of Davis. Not far from Cache Creek Canyon actually, is it?

Baker: No. It's a couple miles.

Swent: And you have an acreage there?

Baker: I bought an old almond farm, or what was left of one--twelve and a half acres and for eight to ten years I brought in the crop. Again, I'm a slow learner [chuckles], and I figured out finally that it was really an expensive hobby. So I finally cut down most of the orchard and put in oats. I had married again, and my wife had a couple of horses, so we had to feed them anyway. So we made a pasture and an oat field and just kept a little fruit orchard and a couple or three acres of trees. I sell that crop some years, if I have a good crop.

Swent: Still?

Baker: Yes. It pays the water bill.

II THE CAPAY VALLEY, SORT OF OVERLOOKED

Newcomers Radical in Preserving Things as They Were

Swent: Was this a time when a lot of people were coming in there?

Baker: Not a lot, but they were a different kind of person. That valley got sort of overlooked, partly for some good reasons. It's one way in and out. There's only Highway 16. To get to Marysville, let's say, or Yuba City or Arbuckle, you have to go way around. At the time it was a little bit beyond the commute for Sacramento people; it's like an hour and twenty minutes or so from there. And it's very hot there in the summer, pretty dry. It's a small valley. It has no exploitable timber; it has mostly small farms; there's no big employer in the area.

Swent: Some of the farms were owned by people who had been there for generations.

Baker: Yes, their whole lives. A couple of my neighbors. One of them is eighty-four now, I think, and he was born there. There are several of them I can think of where that's the case. It's a racially integrated place. Freed slaves settled there in the 1870s and 1880s, and their descendants are still in the community. There are lots of things about it I liked, but primarily the fact that it had been overlooked--people in the Bay Area had never heard of it; people in Davis usually had never heard of it.

Swent: Now the community comprises Rumsey, Guinda, Brooks--

Baker: And some people would say Esparto too, but I think that's changed now. That's getting more into Woodland.

At about the time I moved in, a number of other urban refugees--or people who were looking for some kind of different and more relaxed life--showed up. So there was a group of somewhere between ten and twenty, probably--maybe fifteen, as a

guess--and they all came within a space of about three to four years. And that marked a difference, because ever since then there have been little waves of immigration like this, and they tend to be--well, it's now changing again: there are now some wealthy people who are buying places around there for retirement purposes, and they're putting a lot of money into the places, which is good for the local people who take care of their orchards and remodel their houses, that sort of thing. But it's beginning to get known.

Swent: That's a change, though; I presume you were a do-it-yourselfer.

Baker: Yes. One of the elements that went into this mine controversy was just the fact that you had people who had recently, in a way, staked on this place their hope for their future and their dreams of what kind of life they were going to lead. They had staked it on a piece of property that they had sunk their money into and they wanted to form a community. They were immediately more radical than most of the old-timers in terms of preserving things as they were, which is an irony pointed out to us often and somewhat acerbically by the old-timers, that we were more conservative than they were in terms of preserving things.

Swent: They welcomed some of the changes.

Baker: They had had their fill of preserving it, and they wanted to sell some [laughter].

Swent: They wanted to see some modernization, I suppose, that you didn't want.

Baker: Yes. That's why some several of the older farmers were in the Homestake camp and believed it was good, straightforward American business enterprise at work and that it was going to benefit the economy. They seemed like nice, considerate people.

Swent: Were you welcomed when you first went there?

Baker: Yes. It's a hospitable community, so we fairly quickly felt at home. I had been there six years by the time this came along, and most of the people that were activists there had also been there for anywhere from three to seven or eight years, I guess. So we very soon found ourselves linking up and working together--first of all, to resist that canal I told you about.

Working Together to Oppose a Highline Canal

Swent: Yes, let's just get that background in here too. Nothing ever comes into just a vacuum. There had been the canal and also the gravel mining on Cache Creek. Let's talk first about the canal. This was about 1976 or '77.

Baker: Yes, '76 or '77. If you recall, there was a bad drought and they had just completed building a reservoir at Indian Valley, but there was no water in it because the two years after the completion were the driest years in about a century. There was a severe drought in '76 and '77, so people were very conscious of their water supply. The Yolo County Flood Control and Conservation District, which is the local quasi-public water agency (or power), hatched this plan to build what they called a highline canal all the way from Rumsey, using the bed of the old Rumsey Ditch all the way to Lamb Valley and Esparto. Twelve miles, about. They wanted a big concrete-lined canal with an access road.

Swent: You said that Mr. Rumsey a century ago had--

Baker: Yes, he dug the first ditch with a dragline and a mule, in, I think, 1877, '78, or '79, or something like that. It's been defended in court now as a riparian stream because it precedes the California water laws.

The same flood control agency tried to get control of that water and assess the people the way they did on the extension to the ditch that was resurrected in 1908 or 1909, or something like that. There was a little local organization called the Rumsey Water Users Association, and that's just the people that still live on that ditch and use the water and clean it out themselves and keep up the little diversion dam. The county wanted to make them pay, so they went to court, and the court said you can't do that because these people were here before the law was even drafted. So they had essentially a riparian right.

Swent: Even though it's not a natural watercourse it still is old enough.

Baker: Yes. If it's old enough it gets natural after a while, I guess. But anyway, the payment plan for this big canal was to place a lien for forty years against all the properties that had joined the canal. It was kind of an iron payment scheme you were locking yourself into, and when people discovered what it was really about--in the beginning a number of people had favored it because they said, Sure, more water coming down sounds good to us. But

when they saw what was involved in paying for it and got a notion of the scope of it, they reacted very belligerently against it, and the county had to drop it.

Swent: You might mention the wording of this agreement.

Baker: The people that signed the original petition actually signed a document that had a phrase in it that they voluntarily gave up any constitutional right to withdraw or protest or anything else. So we featured that quote prominently in the public hearings, and it was right there in black and white: we essentially agree to give up our constitutional right to sue or whatever [laughter].

Swent: Pretty astonishing.

Baker: Yes. That was our first exposure to what kind of situation we were in, and it has not changed since then. There has been, in my memory, no time since that we have not found ourselves in opposition to some scheme to bring some form of prosperity or some new benefit from industrial society to our poor, backward, little area. We now know each other pretty well, and we are constituted as a loose and informal activist group which gets labeled with the term "environmental"; I suppose that's accurate in the sense that we care about the place we live, so we end up having to watch publications from the county, watch the paper. It's a kind of a grapevine, and when something surfaces, why, we get in touch and start activating the machinery. The first really serious and long-term battle was with the Homestake people.

Swent: This flood control, the Rumsey Ditch project--you were successful in getting that stopped.

Baker: Right.

Swent: And this brought together a group of you that had a common interest.

Baker: That one was very broadly based. There were some tough old farmers on the steering committee there, and some of us newcomers. It was very representative.

Swent: And it brought in people other than those who actually lived right on the ditch?

Baker: Yes, actually it did. And also some absentee people who had property then that happened to adjoin this proposed canal, and all of a sudden they get a letter saying, "You will be obligated for forty years to pay a fee." They didn't like that [chuckles].

Swent: And this was water they had been getting anyway.

Baker: Well, no. They had wells. They were nowhere near the river, and what they were told is, We're going to construct a canal across your property or across the edge of your property, and you're going to be assessed for it.

Swent: Whether you want it or not. I see.

Baker: Because that's the only way they--

Swent: But you had told me some people were getting water by gravity from the river.

Baker: Well, some people already were on the creekfront. The Rumsey ditch runs close to the creek in places. It was within a few hundred yards. People that had a piece of property between the two could pump from the river--had a riparian right--so the flood control people, up to that point, had said, Go ahead and take it from the ditch. It's the same water; it will just save you the cost of pumping it. What the flood control people were interested in was not really flood control; it was selling water to farmers in the Woodland area, because where the river peters out in the gravel beds out in the main valley there's two big canals there that take what's left of it out into farmland all to the west of Woodland. Those people pay--I mean, by California rates their water is cheap, but they're large farms, some of them, and they draw a lot of water. So the flood control people basically sell them water. That's their main business. But in the case of the people who were on the river already, those people could pump the water out of it anyway. But under the new provisions of this highline canal, they weren't going to offer them that deal; they were going to have to pump it out or else pay for--or actually, I guess they had to pay for the ditch anyway, whether they used it or not. They tried to make it an ironclad thing, where if you were serviced by this ditch, you had to pay for it whether you needed it or not.

Swent: This flood control district--these are people who are appointed or elected? Are they local people?

Baker: They're local people; they're appointed. The so-called districts, there are flood control districts, there are reclamation districts--

Swent: Air and water quality districts?

Baker: I'm not so sure about them--and soil conservation districts. Those operate under a charter from the state. They're not profit organizations. On the other hand, they're not--strictly speaking --state government or county government; they operate under the authorization of the county, but they are just an appointed board, and they have equipment to service the ditches, and they operate the dam at Indian Valley. The man from the State Water Resources Control Board, I think, is who I called to try to find out what was going on with this thing, and he said it's a quasi-public body. It's a murky sort of thing. They don't wear state uniforms, and they have an office, and they have a budget that I suppose the accountants go over and make sure that it balances. But there are no stockholders.

Swent: But this was where you cut your teeth then as a community activist, shall we say? Is that the term?

Baker: I guess so, yes [chuckles].

Swent: Spokesperson, anyway.

Baker: The thing about it that is good no matter what the outcome is, is simply that it's still a small enough place so that when something like this comes up, people talk about it, phone each other, and there's generally a public meeting of some kind.

Swent: And these are held at the Grange Hall? Is that the place?

Baker: The Grange Hall or the Rumsey Improvement Club, which has an old opera house--I mean, that's a fancy term for it, but it used to be for entertainment. It has a little stage and some backdrop cloths that are left to us. It was built in 1903 and leaning [laughter]. It's big enough to hold a couple or three hundred people, so we would have meetings there or at the Grange Hall. And sometimes in the senior citizens center in Esparto. So it's a kind of town meeting place.

Swent: Is there a local pub or corner store or filling station or restaurant or something where people meet?

Baker: Now there's a place called Nichols' Rest Stop, which is in Guinda. There used to be a Guinda Hotel, and it had a bar. It has since been abandoned and the building is falling down.

Swent: But this was the place where the gossip and the news was exchanged?

Baker: Then there are two little corner stores. Some transpired there.

Swent: Guinda is kind of a central place, I guess.

Baker: Well, it's kind of centerless. I mean, the post offices, wherever they are, are the places where the posters go up and people notice things.

Swent: Announcements of meetings and so on.

Baker: Yes.

Swent: I guess we shouldn't get into too much detail on that, but I think all this bears on what developed later. You did mention to me yesterday that one of the current fights is over establishment of bingo games; we won't get into that, but it's an area where people have been active as community people.

A Long-Running Controversy Over In-stream Gravel Mining

Swent: And then the gravel situation does have a bearing.

Baker: That's a long-running--.

Swent: That's continuing, and it started before the Homestake project came in. I was told that Cache Creek gravel is the standard by which all gravel is judged in California. It's the finest gravel there is.

Baker: It's the best, yes. It's called "Portland Cement Grade"; it means that basically you can scoop it up in places and put it in the cement mixer, because it's sand and gravel in the right proportions.

Swent: And it has been mined for a long, long time.

Baker: Yes. Well, since the 1960s, I think.

Swent: I thought maybe before that.

Baker: I don't think it was in any big way; I think that Syar and Teichert and the big operators have all come in in the last twenty-five or thirty years.

Swent: And there was the Williamson Act that we need to mention because that is definitely part of the scene. This is an act that had been passed saying that agricultural land--if it was dedicated to

agricultural use the taxes were lower and it could not be used then for any commercial mining or gravel. It was aimed at gravel at that time, wasn't it?

Baker: It didn't even have to be functional--no, it was aimed at subdevelopers.

Swent: But it was long before the gold mine came, right?

Baker: Yes. I think the act dates from the fifties. One of the old-time political leaders in the valley was a man named Lowrey, and he--

Swent: What was his first name?

Baker: I'm trying to think; it will come back to me. His son's name is Jan Lowrey. Why can't I think of stuff like that any more? But anyway, he was instrumental in supporting that legislation.

The Williamson Act to Preserve Agricultural Land

Swent: So Mr. Lowrey supported the Williamson Act.

Baker: Right. Lloyd. Lloyd Lowrey. It was a state law; he was a state representative in his time. He did a couple of invaluable things, and that was one of them. The other was that there was once a plan afoot to dam up the whole valley, to place a dam at the mouth of it near Capay and dam up the whole Capay Valley. It was a plan that--for a considerable portion of the past century that has been the game in California--to dam up all the rivers and take the water and ship it somewhere where there isn't any in order to raise something or start a community or whatever. So it had quite a bit of support in the legislature, and as I understood it Lowrey practically singlehandedly sank that proposal. For one thing, he had lived a good part of his life in that valley, and he had neighbors that he didn't want to see flushed out. There were all kinds of places in the West, of course, where exactly this happened--some beautiful valley was turned into a reservoir. And the people who had ranches and farms in that valley were paid off and evicted.

He stopped that--or was very instrumental in stopping it. But in the case of the Williamson Act, the people saw some time ago that as the cities began to grow and spread, the value of adjoining farmland went down as farmland and in the meantime the taxes on it went up because they kept changing the boundaries of

cities and assessing taxes on that land which was formerly ag land.

So they devised this legislation to try to keep land in agricultural production or to keep it as a reserve; it was called the Agricultural Preservation Act, and the way it defines agricultural land includes grazing land and it allows land for something that's just called "open space" or recreation. So they were trying to make a very broad protective shield over so-called marginal lands, as well as agricultural lands. The way they did it is that they offered people a tax break for signing up in a nine-year contract, an agreement that the land could not be subdivided.

Swent: But the owner had to actually commit--

Baker: Yes, he had to commit for nine years, and you've got a nine-year tax break. At any time, you could buy out of the contract but you had to pay all the back taxes--not at the special rate but at the same rate as land that's not in the preserve. So it had a safety valve, in a sense, or developers would look at it that way because when the pressure got intense enough on a piece of land that is protected by the Williamson Act, a developer who had the bucks would step in and say, "I'll pay all the back taxes. I'll take it out of the contract." Originally, I believe the act only allowed you to buy out every nine years. That is, once you were in it for nine years you couldn't get out. Then I think they changed that--I'm not sure about this; you'd have to check it, but my understanding is now that you can buy out at any time as long as you're willing to pay the accumulated tax bill on the old assessment or the current version of the assessment rate. That became a central issue in this controversy because--

Swent: There had been pressure to amend this act--the county was able to amend the act on its own.

Baker: Well, they amended a zoning ordinance. The weakness in the Williamson Act turned out to be a provision that allowed uses compatible with agriculture.

Swent: How you define "compatible" then was the issue.

Baker: Exactly. And it allowed counties some leeway in administering the act. For example, the requirements in Mendocino County, I know, are as specific as saying that you have to be able to support a certain number of head of livestock on a place in order to qualify for the Williamson Act--and the minimum acreage limits are different. When I first got my place I had twelve and a half

acres, and you had to have twenty in order to qualify for the Williamson Act. But that has now shifted in Mendocino County; you have to have 160, I believe, to qualify, and I think in Yolo County someone told me the other day that it's up to seventy-five acres to qualify.

Swent: So they were considering amending the zoning.

Baker: This zoning regulation that they amended was a regulation which--probably it was the county's recognition--I mean, it has its own so-called A-1, and--it must be A-2 and A-3, but I'm not sure about that. But A-1, I know, is prime agricultural land, and that's the zoning that is set by the county, the acreage limits on it. And AP land--so-called agricultural preserve land--is land that is covered by the Williamson Act. But the specifics of how that is defined are apparently left to the counties to enact as zoning regulations.

A Zoning Ordinance Amendment Which Benefited Gravel Miners

Swent: Then this amendment would somehow benefit this subdividing?

Baker: Well, what the amendment specifically did was allow people to impound water and make reservoirs to support business activity that was not directly related to agriculture and, in particular, mining. The actual wording of the zoning regulation amendment stipulated that you could impound water for mining purposes as long as you didn't diminish the agricultural potential of the land and as long as your impoundment might ultimately serve the benefits of agriculture. But it seemed perfectly clear to us that this was twisting around to--I never have understood why the county didn't just allow Homestake to buy out of the contract, because they would have improved their tax revenues incredibly. The tax revenues that they expected under the Williamson Act was something like $39,000. Homestake had some 2,000 acres overall that were in the AP zone, and the tax bill on that without the Williamson Act protection would have been a million something. I don't know why they--

Swent: Something that I read in one of these newspaper articles--a couple of points--I think that this amendment was already under consideration before Homestake even came into the picture, wasn't it? I mean, the zoning ordinance wasn't amended just for Homestake.

Baker: It certainly looked as if it was to us.

Swent: I thought that that was already--

Baker: There was consideration of zoning regulations regarding gravel mining; that was already going on. It's true it fitted into that, but this particular change and the timing of it seemed to us clearly and directly related to Homestake.

Swent: There was one newspaper article, and I guess I don't have the time to hunt it right now, but it did say that the point you just made --the spokesman for Homestake said that they could opt out but that they'd rather wait for the zoning ordinance amendment. I think the county would have allowed them to probably pay the higher taxes, wouldn't they?

Baker: Well, I don't know why they didn't. Politically, they could argue--I mean, they might be trying to--

Swent: [looking through papers] This was from the Sacramento Bee in May '83. Betsy Marchand. These are just my notes, in regard to Davis Creek: "HMC land under contract to be agriculture under the Williamson Act. Marchand suggested HMC take its land out of the Williamson Act contract. This would incur a tax liability. Krauss said the county planning staff recommended against this because county was considering zoning amendment to allow reservoirs for sand and gravel mining on ag preserve land.[1] HMC will wait for this."

Baker: Of course, sure they would.

Swent: Now wait--this was in the Clear Lake Observer from May 28, '83. So clearly it was to Homestake's advantage to pay the lower taxes [laughs].

Baker: Of course it was. But since they offered to buy out, I don't understand why the county didn't take them up on it. I suppose if it was common knowledge that they were considering--I mean, it is true that gravel companies wanted to mine gravel on AP land, and the argument that they were using was that it was bank stabilization and erosion control. There are circumstances in which the old-timers tell me that that's correct; you can re-contour the river course to minimize the erosion of a certain

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[1]Raymond Krauss, interview in the McLaughlin Mine/Knoxville District oral history project, Regional Oral History Office, The Bancroft Library, University of California, Berkeley, in process 1997.

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LAKE COUNTY'S HOME OWNED COUNTY WIDE NEWSPAPER

Napa planners delay Homestake EIR

By Doug Ernst

NAPA — Yolo County Planning Commissioners succeeded Monday in delaying the certification of the McLaughlin Gold project draft Environmental Impact Report (EIR) but fell short of their requested 60 day postponement.

The draft EIR was scheduled for certification by the Napa County Conservation, Development and Planning Commission on May 4, but will not be certified until all three counties involved in the mine project have a chance to hold hearings on the final EIR, Napa Planners agreed on a three to one vote.

Napa Planners on May 4 will approve a schedule for hearings on the final EIR in Lake, Yolo and Napa counties.

After closing the public hearing on the draft EIR and after making their decision, the Napa Commissioners made a quick exit.

"I'm not happy," said Jan Lowrey, chairman of the Yolo County Planning Commission which agreed to ask for a 60-day continuance so that more people could be heard on the draft EIR.

Because most of the gold to be extracted from the mine is located in Napa County and because Napa is centrally located, Napa County was selected as lead agency for the project and was given power to certify the draft and final environmental documents.

"This procedure is alien to us," Lowery said. "But the Napa Commission made the best decision they could make within the time frame they had to work with."

Jack Thompson, McLaughlin project manager for Homestake Mining Company (HMC) also was not entirely happy with the Napa Commission decision.

"Any postponement past May 4 will hurt," said Thompson, who last week said a 60 day delay by the commission could mean a nine month delay in construction and preparation of the mine.

"Still", Thompson conceded, "This is an improvement over a 60 day delay."

Early in the meeting, HMC Executive William Humphreys told the commission that the company must complete dams and roads and prepare the mine and mill site for a foundation before the rainy season which typically begins in November.

"The latest we could break ground is July 4," Humphreys said.

Napa County Planning Commissioners must certify the draft EIR before Homestake can begin to acquire permits necessary for mine and mill site preparation.

Monday's meeting was packed with Homestake consultants and concerned citizens who argued throughout the four hour hearing about the completeness of the draft EIR hearing and the public hearing process.

Lowrey said the public did not have adequate time to comment on the document, despite one hearing in Lake County and two hearings each in Napa and Yolo counties.

Bob Reynolds, with Lake County Air Pollution Control District, said the draft EIR failed to suggest a solution to the possible pollution of air and water with asbestos fibres — a product of the open pit mine operation.

In addition, Reynolds said the draft EIR should require continuous monitoring of emissions, with alarms, and a ban on mine related traffic through residential areas or during the night.

Nadine Calvert and Corrine Barker told commissioners they planned to retire on property their families have owned for years, but that the mine threatens their plans.

Yolo County walnut, orange and almond farmers John Cetras and Avery Tindel told commissioners that airborne particles from the mine, six miles to the west, threatens their livelihood.

Tindel said the mine is expected to generate 15,000 pounds of dust particles a day, while Cetras said some of the dust will be hazardous asbestos, mercury and cyanide.

However, testimony was also receiv-

* please turn to back page

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HOMESTAKE EIR

Continued from page one

ed from persons arguing that pollution can and will be carefully monitored and controlled.

"The draft EIR is a very complete and sensitive document," said Jack Streblow, president of Napa's Basalt Rock Company.

"It is important to note the high reputation that HMC has as a responsible mine operator, going back for more than a century. These people have the capability to control environmental effects of the gold mine project," Streblow said.

Ray Krause, Homestake's Environmental Manager for the project said, the company has taken unprecedented measures to be sure the mine's effects are adequately mitigated.

"We are committed to local hiring and we understood Lake County's concern that the project not impact on local schools. We have already met to discuss training opportunities for local workers," Krause said.

Dave Crouch, HMC Corporate Manager for Environmental Affairs said dust particles generated from the mine project will fall onto HMC property within one and a half kilometers of the open pit.

Less than a gram of asbestos dust will be generated daily, he said.

Hydrogen cyanide dust generated will be one tenth of the acceptable level for worker exposure, he added.

And he said, "There will be insignificant emissions of mercury." "None of the regulated pollutants from the operation will reach or exceed 50 percent of the accepted state standards," Crouch said.

bank--if there is a good field there. So one of the things you can do is take out gravel upstream of that from a certain place in the bend, and it will keep the water further away from undermining that bank. There are limited specific cases in which that's true. But even then, before Homestake ever came along, anyone who looked at it understood that this is not a matter of a farmer re-contouring the bed strictly for that reason; this is a side benefit of the removal of massive amounts of gravel for profit. That's what's going on here. And because the Williamson Act <u>tries</u> to protect agricultural land, in order to get at it they have to have a cover reason. They have to have a justification in terms that that act uses. So if you can argue that you are stabilizing a bank or controlling erosion, then you can remove the gravel.

In terms of Homestake, of course, it's a much harder case to make because the reservoir, for at least twenty-some years, is going to be exclusively devoted to supplying water to a slurry line to process ore; it has nothing to do with agriculture.

III HOMESTAKE MINING COMPANY AND DAVIS CREEK

Water: Crucial for Farmers and Miners

Swent: So now we come up to the Davis Creek Reservoir. Let's clarify that. So the gravel mining was already in the picture, and you had been involved as a community?

Baker: I had not.

Swent: But there were community concerns.

Baker: Especially the people who lived next to the gravel mining operation. They were the ones who were keeping track of it and bringing it to our attention. But it had not really coalesced into a powerful issue--I mean, the gravel companies were already set up and running and had been for years, and there was not much hope of rolling that back--just the hope of containing it.

Swent: So then we come to 1980, when Homestake made its announcement--I think it was August of 1980--that they had this gold mine, which was in Napa County. At that point, Yolo County wasn't even in the picture. It wasn't until later down the road--I don't know when exactly--but they needed water and they looked around for possible sites and selected Davis Creek.

Baker: I think even without the reservoir there was still a corner of the county--most of the mine lies in Lake and Napa County. In fact, I think most of it is in Napa County.

Swent: The mine is mostly in Napa, but there's a little bit in Lake and a little bit in Yolo. But then the impact--well, the mine would have of course an impact on the county too, but then they selected Davis Creek as the best place to dam for the water that they needed for construction, I think, as well as for processing.

Baker: It was a crucial component of their whole operation because they--

Swent: And that's when they had to get the permits. I guess they had to get permits to mine also, from Yolo County.

Baker: Yes. But that was not as significant as the permit to--

Swent: It was the Davis Creek Reservoir that really put the fat in the fire, didn't it?

Baker: On the other hand, it was their strongest selling point to the supporters they did have in our county, because people are so water-conscious there that anybody who impounds some and keeps water that would otherwise run off is going to be positively assessed, other things being equal. They're going to say, We can always use the water, and we don't care what the purpose of it is if it's going to be there indefinitely and it supplies water then they can't oppose it.

Swent: Davis Creek didn't run year round.

Baker: No, but it runs enough.

Swent: Cache Creek does.

Baker: Yes. But in the rainy season it's a big enough little corner of the watershed so that it's a reservoir of 180-some acres.

Swent: And it runs directly into Cache Creek, does it?

Baker: Yes, the course of it does, and when it's running in the rainy season it runs into it.

Swent: There's a dam at the end of Clear Lake which lets water go into Cache Creek.

Baker: Yes. It raised the level of Clear Lake nine feet. And that water belongs to the Yolo County Flood Control and Conservation District.

Swent: The top nine feet of Clear Lake belongs to Yolo County [chuckles], although Clear Lake is in Lake County.

Baker: Right. They bought it from a bankrupt water and land company, who bought it from another water and land bank company who acquired it from a railroad and land company in the great nineteenth-century giveaway. It's the story of the West.

A Public Meeting in the Guinda Grange Hall, 1980

Swent: So all of that comes into the historical picture on all of this. The first public meeting that we know of was not until a couple of years later--the 1980s--when the announcement was in the papers that this gold had been found. But then public meetings weren't held for quite a while.

Baker: No, I'm pretty sure we had a meeting in the fall of '80. It had to be. It was in the Grange Hall, and it was styled as an informational meeting; it was a presentation by the Homestake people.

Swent: This was the Guinda Grange Hall.

Baker: The Grange commonly does that. When there's an election, it invites the candidates to come up and talk.

Swent: That's their function.

Baker: Yes, and they do it very well. So the Homestake people were there, and they sketched--

Swent: Do you recall who it was?

Baker: That guy was only around during the preliminary stuff. It was a medium-sized blond-headed guy who seemed to be leading it.

Gold Triggers a Pleasant Exhilaration

Swent: It could have been Don Gustafson; he was the geologist.[1]

Baker: It could be. He was very smooth, well-spoken. One of the old-timers said that he had run across him up in the hills up there--he was, I don't know, hunting or just cruising around--and he ran into this guy up there, and the guy gave him some misleading story about why he was there. I mean, he clearly had a pickup and tools and was doing some kind of assay or assessment or survey work of some kind. I forgot what the cover story was, but they both

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[1]Donald Gustafson, interview in the McLaughlin Mine/Knoxville District oral history project, Regional Oral History Office, The Bancroft Library, University of California, Berkeley, in process 1997.

laughed about it; the guy was not going to use the word gold, obviously, that early in the game. But they recognized each other and had a laugh about it. Everybody laughed about it, and I remembered that was one of the times when I was alert to the fact that in the West, in California, if you raise the prospect of gold, for many people that triggers a pleasant blend of exhilaration and inquisitiveness and adventurousness. There were already figures in the billions--a billion or two billion in gold is there--and there were eyes shining in the room, I could tell, and the whole thing set off my alarm system [laughs].

Those early meetings may very well have gone unrecorded except maybe in the local paper and maybe not even there. They were doing their ground work, their PR work.

Swent: They were informational to tell the public what was going on.

Baker: I remember there was a little speech about how the days of corporate rapacity were long gone, and they were going to do this right, and that was the line from the beginning--we want to be good neighbors, and we want to do a clean project.

Swent: You didn't feel it was sincere, though?

Baker: Oh, I wouldn't say that. I would say it was very difficult to assess the level of sincerity. It is difficult for me to assess that level because I think--well, we've all had plenty of experience with hype, and at this point no corporation now operates without it. Their message is that they are very good for us and very good for the environment and very good for the future. So it's what you expect to hear; you can't say right offhand how deep this runs. They did, I think, when they finally got into building and operation. In terms of their trade and that context, I think it is a clean project and a well-run project and probably one with minimized impacts. I'm willing to grant all of that. But I also think that a significant measure of that cleanliness and commitment to monitoring and restoration are the consequence of our having kept the fire under them the whole time. They admitted that to us a couple of times, and said that this would be a very different project if it weren't for you people.

Trying to Block Approval of the Environmental Impact Report

Swent: Okay, so now we get to what you did. The first thing they had to do was to get the environmental impact report approved by each

county, and that's when you started your efforts to block them, right? Was it clear?

Baker: It was not clear to us. We had people in our group who said blocking it is just out of the question, and they were right. Realistically I think--

Swent: Even at the beginning--

Baker: Oh, yes. Robert Speirs and Avery Tindell--[1]

Swent: Tindell was a long-time resident?

Baker: No, he bought in after I did, I think.

Swent: Oh. He's older than you though, I guess.

Baker: Yes, late seventies. Actually he had only been there a couple of years.

Swent: And Speirs?

Baker: Speirs also was about the same time I came--'75 or '76.

Swent: You said the old-time people were not so skeptical about all this.

Baker: No. Sure--mine? Gold? If they'll make some money at it and employ some people and it's over the hill there--and they were right, from their perspective. We overestimated the impact.

Swent: It is pretty remote from you; it is over a hill.

Baker: Yes, it definitely is. And it's mostly in another county, and they were right that we had very little control in the end because it was a three-county thing, and any time you've got two of them going the same way, then what was the little third county going to do? Oppose the whole thing?

Swent: I think I kind of interrupted you. You were saying it wasn't clear at the beginning which way you would go.

Baker: Speirs and Tindell were saying things like, We had better have a plan for assuming it is going to go through, because we want to

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[1]Avery Tindell, interview in the McLaughlin Mine/Knoxville District oral history project, Regional Oral History Office, The Bancroft Library, University of California, Berkeley, in process 1997.

make sure that they do do it right. And we want to make it as safe and minimal a project as is possible to make it.

Swent: So that was sort of a compromise position right from the start?

Baker: I think Speirs always held that position and wanted to make sure that some extraordinary sensitivity to the environment was part of that project from the beginning. When he got into the actual fray, sometimes he would forget and speak pretty strongly as if he wouldn't mind if the whole thing went down [chuckles]. But that happened to all of us; we got caught up in the--.

Concerns about Air and Water Pollution

Swent: Did your feelings evolve? If you can remember how you felt at the beginning--

Baker: Oh, yes. At the beginning I was a fairly new resident and I liked the place and we'd been through the thing with the canal. So when they started talking about--I've forgotten what it was--30,000 tons or so of particulate matter going into the atmosphere and I forgot how many parts per million of sulfur dioxide and carbon monoxide; the fact that there would be tailing ponds full of cyanide-treated residues a couple thousand feet higher than where we were in the drainage system, and the fact that the whole thing did sit on a fault zone--in the beginning, those were all things that I was concerned about and got involved with.

Swent: Where did you get this information?

Baker: From their own sources, and the company had its estimates for how much ore they were going to move. So then we took a trip up to look at the valley; I actually had never been there until this came up. I had been close, but I had never been to the very site.

Swent: To the Davis Creek or the Manhattan--

Baker: To Morgan Valley. It's a beautiful place. That entered into it.

Swent: It had been pretty ravaged by earlier mining; it wasn't untouched by any means.

Baker: That's true. But relatively, compared to a mile-long pit seven or eight hundred feet deep. Anyway, that was operating in the beginning, and then as we got into it we found out that they had

polluted South Dakota, that they were being sued someplace in Nevada, I think it was.

Swent: New Mexico. I think you mentioned the suit in Milan, New Mexico.

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Swent: So it was the air and the water pollution that particularly concerned you.

Baker: And mercury. One of the things that the group did--again, this is mostly Speirs's influence; he's a pathologist, retired--we were assembling a small library of papers and facts about the company and its history, but also about various kinds of heavy-metal pollution. There was a whole controversy, for example, about the mercury that's in the area that exists as a mineral deposit. It's not cinnabar; I've forgotten the exact--

Swent: There is cinnabar.

Baker: Yes, but it seemed to me there was another one. They're all red [chuckles]. The mercury in that form was supposed to be mostly harmless because it was not readily soluble. But Speirs pointed out that rainfall over the whole continent has gotten more acidic and gets more acidic annually, so we should have more up-to-date information on what was going on with the streams. So monitoring that mercury level became an important issue, and we built into the final plan a pretty comprehensive testing system to make sure that that did not endanger the water in that reservoir. It turned out that we were at least partly right there. The question of runoffs from various mineral salts and soils, that picture has changed because of acid rain. It does change the concentrations.

Swent: I don't suppose anyone had thought of monitoring the water for mercury before.

Baker: Oh, we had thought of it, but the first couple of geologists that they brought up had glibly said that this is an insoluble form of mercury. We were able to get up right after that and say, That that has been true historically until very recently, but because of acid rain there are different concentrations. And also agricultural runoff affects that to some extent. Anyway, what I meant to say is that we were compiling information--

Information as Ammunition

Swent: Doing a research operation on your own.

Baker: Yes. And that was fun, but it also made us pretty fully aware, I think, of the size and scope of the operation, and that there would be effects. The part that still I have some qualms about is the degree to which both sides were using information simply as ammunition. At some level, again on both sides, I think it leads to a disrespect for information as such. In other words, whenever it doesn't qualify as ammunition for your position you ignore it or suppress it, and that's bound to be unhealthy ultimately. To say that it will work itself out because people expect you to be partisan--

Swent: If it balanced, it would.

Baker: But when you have balance in the form of someone who calls himself a scientist and has a reputation as such, and they are testifying basically for one position, and another scientist equally qualified is testifying on the other side--for the people who are supposed to decide policy sitting in between, it looks as if both sides are at some point not being quite honest. In theory, it should be possible in such a debate for one of the people to say, "Your figures are more accurate and up-to-date." But they never do that. In a real, open exchange of scientific information it's been my experience that scientists do respect each other for being willing to yield, because the truth is staring them in the face. And in many of these hearings they just look like hired guns.

Swent: It wasn't done for scientific inquiry.

Baker: No. And if you think about it--they call up somebody and say, "We'll pay you a fat fee and fly you to California and pay all your expenses. We just want you to go over this case and present it for us." That's not really quite kosher, in my view anyway. I understand how it seems to be getting harder and harder in the whole social order to reach that ground where an issue is discussed with a real commitment to find out what the truth is.

Swent: Was Speirs the only scientist in your group?

Baker: No, there was also a guy--he's gone now, and I don't remember his name--who was a chemist.

Swent: So you did have some scientific knowledge on your side.

Baker: Yes. And Tindell was an insurance specialist. We got some people from the university a couple times who gave us some data. But Speirs was definitely the guy [inaudible].

Swent: So you were simply going to a lot of these meetings that were called?

Baker: We developed press releases. We were perfectly aware that the campaign was for public sentiment. And Homestake understood it; they opened an office in Woodland and met all the Chamber of Commerce people and had slide show presentations and all that. They were applying a lot of grease, and they did it well. They have money, and they bought talent that knows what it's doing. They had good lawyers, and Krauss is a masterful PR [public relations] person. They ran a very good campaign.

Swent: Did you call meetings of your own?

Baker: Yes, sure. In the thick of it we were meeting every day or two.

Swent: Not public meetings, though--just your own?

Baker: No. Just our group. But we also had public meetings.

Swent: You wrote a lot of letters to the editor.

Baker: Right, we did that. And whenever there was a public hearing--we even went to some in Napa County.

Swent: The papers that you dealt with were the Sacramento Bee, the Solano--

Baker: Right. The Clear Lake Observer, the Woodland Democrat, the Davis Enterprise.

Swent: You were mostly concentrating on those local papers.

Baker: The [San Francisco] Chronicle came up, and they did a story on it.

Swent: But you were having your contacts more with the local papers.

Baker: Yes. I think from their point of view they underestimated us at the start because, you know, it was a real funky place. The Guinda Grange Hall is just an old grange hall and just a few old farmers, and they seemed to be amenable to it. And it's a small rural area.

Homestake's Historic Stream Pollution in South Dakota

Baker: They were going to appear before the [county board of] supervisors and make a presentation open to the public and that people could speak at. They were already pumping very strong this environmental line about what stewards of the land they were and so forth. I knew that their main operation was in South Dakota, but I picked up a mention that they were at one point involved in paying a fine to the State of South Dakota for polluting a stream. So I called the attorney general--his office--in South Dakota and said, "What's the story here?"

The guy just told me what was going on, that yes, they were cited for the stream and "Did you know that they're the only corporation that's ever been cited twice? It's a Superfund site."

I said, "No, I didn't know that." So I took all this down.

When this meeting came about, they went into their performance on their environmental responsibility. When we would get something juicy like this, we would parcel out the--instead of having one person deliver the whole thing, since you only get three or five minutes before the supervisors, one person would give a part of it and then the next person up would give the second part of it and so on. So we just laid out this string of charges and suits and fines.

Swent: "We" meaning your group--seven or eight of you.

Baker: Yes. And I could say legitimately that I did not invent this, but I spoke to Mr. So-and-So in the attorney general's office in the state of South Dakota, and this is directly what he told me. One of the things he said is--I said, "What about this creek?"

And he said, "Well, it's not a creek any more; it's just kind of a sludge."

I said, "This is what happened to a creek in South Dakota, and I'll quote the attorney general's office."

So I think they learned after that that they had underestimated the opposition a little bit. They had to get their lawyer to call the--the head of the company is buddies with the governor of South Dakota--or was at the time--so I imagine this got back, and immediately the next meeting their lawyer got up and read a letter from the attorney general himself saying that we must not misinterpret this, that Homestake has had a wonderful

contribution to make to South Dakota and so forth. That was a sign that we had stung them there.

The Front Line: Conflicting Philosophies and Principles

Baker: That got to be the pattern; we would have our science and our testimony, and they would have theirs and we would show up at the meetings and start in on it. In the course of doing that we realized that the only thing that really matters in this project as far as Yolo County is concerned is this reservoir. The justification under which this reservoir was being created is very thin; it has to take place under the rubric of this Williamson Act, and the whole point of that act was to ensure things like open space and recreational use of the land. That's clear in the language. What they're saying is, We want this to remain farmland or potentially farmland, and not be used for industrial, commercial, or any other purpose. It got down to that issue, and it was important to them because they had to have the water, and to get it another way would have been really troublesome and expensive; they wanted that water very badly. So that became the front line.

Swent: As a strategic matter, then.

Baker: Yes. I meant to point out that I finally decided that the undercurrents in this conflict really didn't have so much to do with air pollution--that is, they could demonstrate that it was at a tolerable level. They were far removed from any urban center. The chances for water pollution from those tailings ponds was slight; it was there, but it would be fair to say that it was slight. There was no getting around the aesthetics of the mine; there was certainly no improvement over what was there, but it's a remote area. And there is already a road in there; it's not like it was a wilderness. All of those various levels were points of encounter. Their case was pretty good, and if you stuck to it on what I call normal, rational grounds, there would be a very strong chance that they would prevail and that it wouldn't do any lasting and severe damage to anybody's life--except that there were a couple of people who had property in that valley. Of course, they lost it and eventually sold out--there was a holdout for a while; they didn't want to sell.

Swent: In the Davis Creek Valley, you mean.

Baker: Yes. So that's when I thought of the whole thing in terms of what I'll call the philosophical level. There were issues of principle involved that transcended the particulars of the case. I think other people in the opposition group--although we seldom talked about it in any direct way--I think they were motivated on the same grounds. Conversely, I think some of the people in the Homestake camp were equally committed to what's called a moral vision, (you can call it that), so that they were fighting in part on grounds of principle, too, that there is a very high place to be given now to the responsible corporation, who acts sort of in the name of the whole society. And when government sides with them, it confirms that view of themselves and their mission. They go from their point of view as far as they can go in terms of saying we'll try to restore the land to what it was after we're through with it and while we're conducting this operation be sensitive to the traffic patterns in the area and so forth. They went as far as they felt they could reasonably go. To those of us who were arguing from a different set of principles, that's not far enough. In our--to their point of view--benighted way of looking at it, we also represent a direction that society could take, and I was equally committed.

Swent: I think you used the phrase--when we were talking earlier--that there were just two different versions of reality here.

Baker: Yes. The newspaper woman from the Woodland Democrat--they had a very good one who did an excellent job of reporting on this whole thing--what was her name? Susan?

Swent: I don't remember; I have it somewhere too.

Baker: Maybe it will come back to me. But anyway, one of her stories was basically interviewing me and interviewing [Harry] Conger.[1] It was interesting to me to look at the two views, because a couple of the things he said, from my point of view, didn't square with reality. And I'm sure some of the things I said must have galvanized him in a similar way. One of the things he said was all these fears of exploitation and exhausting the planet's resources were misguided because the resources of nature are infinite. And I thought immediately, No, my friend, we measured it: the planet is not quite 8,000 miles through and 24,000 something around, and that's it. That's finite. We've figured it out. But what he meant, of course, is that human ingenuity will

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[1]Harry Conger, interview in the McLaughlin Mine/Knoxville District oral history project, Regional Oral History Office, The Bancroft Library, University of California, Berkeley, in process 1997.

find a way to keep combining and recombining and mining asteroid belts or whatever we have to do so that this pattern of development and progress is never going to end. And I realized that probably most people in the country agree with him; they still think that the human race is capable of a kind of infinite command, gradually increasing over the universe. I deeply do not believe this. When something like this mine comes up, underneath the particulars, I could sense the conflict of these visions and sets of moral values.

Sometimes a Matter of Definition

Baker: Sometimes it was a matter of definition. Ray Krauss got really upset at me once because I found out that Homestake had borrowed money to float this project, in layman's terms. Actually, in financier's terms, they didn't borrow it; what they got are called short-term loan guarantees, which means they shop around on the international money market, and they say basically, We're Homestake, we've got these assets, we're a flourishing company, and now we've got this project developing. We want to know if you would guarantee a loan if we take it out on this. When they had that guarantee, then they could borrow at the lowest interest rates. But when I said they had to borrow money for this, of course, technically that wasn't true.

Swent: It was hypothetical loans, I guess.

Baker: It was an advance credit line, is what it amounted to.

Swent: That's a semantic thing.

Baker: But just the term "environment," the term "impact," the term "significant." What's significant and what's unsignificant? Lots of those little definitions and word plays, underneath them I would sense these sort of tectonic plates of attitude butting up against each other.

I would think this is worth fighting out even though--actually, it occurred to me this morning, one of the things I would tell myself when I would be sitting through these committee hearings or supervisors meetings or planning commission meetings, and here was this whole row of high-priced lawyers and experts in geology and engineering and so forth in their suits flown in from God knows where and their own slide projector and show and whole staff ready--who were we kidding ourselves that we were going to

stop these people in their tracks? I would think, Of course not. Of course it's going to go, and eventually they will get their mine. So what are you sitting in here for, and what are you doing here? It occurred to me a couple of times--actually, a hundred years from now, in our chambers anyway, even in Yolo County, they're recording the meeting, and they're filing the tapes. And I thought, Someday some historian is going to be going through the wreckage of this ________ civilization--if they still have tape recorders--I'm exaggerating--they're going to look through that and they're going to say, Well, not everybody signed on to this thing; here's a couple of wackos off here saying, Wait a minute, you guys. Do we have to have every gold mine? Do we have to have every freeway? Does this have to keep going on or not? We're saying that no, it doesn't, and we're sitting down here. Of course the bulldozer's going to run over them, but at some point the historian will say, Well, there was some opposition.

Swent: And every bit of delay is--

Baker: So that's what I ended up saying to myself, to keep myself in those meetings. Once we saw them hasten that zoning regulation through in spite of their own rules and get away with it, then we knew they were--

Supervisors Broke the Rules to Thwart a Referendum on the Zoning Amendment

Swent: Yes, you spoke quite strongly that the supervisors had to break--if you want to mention that.

Baker: Yes. The regulations call for--the legislation at the county level follows a certain procedure, and usually a draft resolution appears before the supervisors, submitted by the planning commission often. They revise the draft, decide on the final language, and then they vote to adopt it. It doesn't simply become law at that point. What the law says is that first of all you have to publish the legislation in the nearest format, in the local paper.

Swent: This was the proposed change to the zoning amendment.

Baker: Yes. But it could have been any resolution. For it to become an ordinance, it has to be published, it has to be read at the first meeting, and then it's supposed to have a second reading. Then

thirty days from that period, from the second reading, it becomes law. Well, we had this referendum--

Swent: Yes. Let's mention that and make clear what it is.

Baker: We thought that if we could get a measure on the ballot which asks the voters to approve or disapprove this reservoir--the big impact or the big change--Davis Creek--

Swent: Was the referendum specifically for the reservoir or for the zoning change?

Baker: The zoning change was going on anyway. The referendum would have intercepted it and said that the voters of the county want this put to a vote.

Swent: The referendum was not whether or not to approve the reservoir. It was whether or not to approve the zoning change; am I right?

Baker: Yes, but everyone understood that the reason for the zoning change--

Swent: --was for the reservoir, but the words of the referendum were not clearly saying that.

Baker: What it basically said is that you can't take agricultural land and use it for this other purpose and pretend that you're not [laughs], to put it from our perspective.

Swent: Yes. I just wanted to make clear: the referendum was on the zoning amendment.

Baker: Yes, I believe that's right. But in shorthand it meant that Homestake can't build their reservoir because the voters have said they can't. And that was a stronger force than the supervisors.

Swent: So for your referendum you needed to collect signatures.

Baker: We needed 4,400 signatures. We just got onto it after the first reading, see. We thought we had thirty days. In the first twelve, I think it was, they got 3,500 signatures. But then the county counsel said, No, we have bypassed the second reading; we're not going to have a second reading. It's going to become an official resolution, basically at the end of two weeks instead of thirty days.

It seemed perfectly clear that they were spooked. We also explicitly asked for an extension if that was the case. I said,

Why don't you make an exception to your new policy [laughs] and allow the time period that's been allowed for years for every other piece of legislation?

They of course refused to do that, and it was perfectly clear at that point that they were spooked enough that they wanted that resolution to become an ordinance before we had a chance to get those last 900 signatures, because we most certainly would have gotten them in two weeks.

Swent: You got a lot of them on campus, I think. Is that true?

Baker: And also just on the street. We had people out there with tables at shopping centers.

Swent: At UC Davis there was a mobilization for this.

Baker: I unfortunately was not part of that final mobilization. For one reason or another I had to have a break, and I wanted to get back to a place in Peru that I had been four years before and had good friends there in an Indian community, and I wanted to get back and see them. That was my chance to do it--in the summer before--

Swent: So you were there [in Peru] that summer.

Baker: Well, for six weeks, and it happened to coincide with when the registration draft went on. I wrote that particular letter you showed me after I got back, and I found out all the particulars.

Swent: So that's the letter to the editor of the Daily Democrat of April 18, 1984.

Baker: It was already all done.

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Swent: That was your best chance.

Baker: Yes. That was our best shot at stopping it. I had already picked up clues from the supervisors in meetings that they were not going to abide by what seemed to me the clear spirit of the Williamson Act.

Swent: Excuse me, but I'm confused about this. It was May of 1983 when the planning commission rejected the EIR [environmental impact report], and this amendment was in 1984, this signature referendum.

Baker: It was proposed--no, the signature referendum was in the summer of '83. Probably July or August.

Swent: The EIR was rejected first in May of '83.

Baker: Yes, I was dealing with that, so I was still around then. The referendum must have been August, yes. But there was intense agitation going on at that point. The county was vulnerable on that issue; when you read the Williamson Act, the language of it is very clear. It's to preserve remote areas like this, and grazing land and marginal places where somebody might want to put an industrial or residential development--those were the two forces that were to be kept at bay. To us, open-pit gold mines were definitely industrial, definitely commercial. And they had nothing to do with agriculture. That seemed perfectly obvious to us. But by the extent to which they were contorting the logic, it was clear that the supervisors wanted to do it, that they were under heat from both the company and probably the supervisors in Lake and Napa counties too--I had that impression.

There was an urgency to get it done, and when this petition surfaced, they thought, Oh, my God, if they're allowed to get these signatures and they get it on the ballot--or once it's even slated to be on the ballot, we can't hurry through and try to do some jerry-built legislation in the face of that. So that's why they departed from standard procedure and didn't do the second reading; that two weeks would have been enough.

That was the other lesson I got from it: the laws that are supposed to protect you and the procedures that are supposed to be ensured as part of due process are not dependable. You have to be very alert, and you have to have--hopefully, as an organization, the first thing you should do is build as big a bankroll as you can get because you're going to need a lawyer and you're going to have to threaten them with that to get anywhere. Otherwise, they will take the words and fabricate a new structure and say that now it's okay, it's now "legal." As I read the law--I mean, I went into the law library in the county, and there was one of those secretaries--I could just tell by the way she handled herself and knew the calendar that this is the head secretary; she knows more than anybody else in this whole office, that would be my guess. She said, "What are you looking for?"

I said, "I'm looking for the statutes that cover the procedures for passing county ordinances."

She said, "Okay, right over there is the county code and I think it's volume whatever."

I said, "Just as a matter of curiosity, what if you have a proposed ordinance and it's been adopted, but it doesn't receive a second reading? It's published in the paper, but it doesn't receive a second reading."

Just as quick as that, she said, "Well, then it doesn't have the force of law." That's interesting [laughs].

When I contacted the grand jury people and wrote them a letter, when the guy responded finally, he said they were not going to initiate any indictments, but that they were going to reprimand the county because it was--he said technically they have the power to forego that second reading, but it takes some kind of mitigating circumstance; usually there's an emergency, public health and safety. He said, "We don't think that this qualified. So there will be a formal reprimand." But at this point they were already building the reservoir so it didn't matter.

But you learn there that you can't depend on attorneys general or you can't depend--the courts are your last hope now and to play that game you've got to have money so that you're in the same ballpark as your opposition--you become an interest group and you buy your talent and you go in. But there's something about that, as I said earlier, that rubbed me the wrong way. I wanted it to be a situation where the law was there, and people had their minds at work, and you went in and presented your case, and someone else presented theirs. Then the people empowered to make the decisions would act on that information. That's a very naive and idealistic view. This process cured me of such innocence.

Swent: Were you at this all-night meeting when they finally--

Baker: Oh, at the planning commission?

Swent: When they rejected the EIR?

Baker: Yes.

Concluding that Lawmakers are Wasteful

Swent: That must have been pretty emotional. That was one that you won.

Baker: Yes. Well, it was, but it's deceptive because I've now been through this process also in other cases, and as I said, I think one of the grim conclusions you can reach is that a body of

lawmakers now will take the path of the absolutely most wasteful and exhausting expenditure of resources as a way to partially satisfy all parties. In terms of this situation, they could have possibly in some surgical way right at the outset said either openly or clandestinely, There's no way this county is ever going to turn its back on this gold mine; it's not going to happen, people, so forget it. Would have saved ourselves a tremendous number of meetings and a tremendous amount of effort. But what they do is they say that they're going to be open to persuasion, and they even at some point will take an action like the planning commission took--one agency in the bureaucracy will get swayed and carried away and act, and then it will be a whole procedure to get that countermanded to then get this thing back on track. At least that's the cynical view of it. Avery, probably, and Bob Speirs would both tell you that no, we did salvage the other goal, which was to make this a responsible project--to build in a corrective mechanism.

One Goal Salvaged: to Make it a Responsible Project

Swent: You did get a lot of monitoring built in.

Baker: Yes, and by good people.

Swent: Goldman. You respect Goldman?

Baker: Yes. He's a well-respected scientist, and that was his specialty.

Swent: Goldman was a fish--I've forgotten the term--ichthyologist?

Baker: No, he's a pond and reservoir expert. He's an aquatic biologist, and his specialty is things just like this reservoir.

Swent: So he tests it periodically and reports.

Baker: And there's a whole body that reviews and checks those things. From that point of view the process worked. But what I'm referring to is the--I guess politicians are in the position where they have to appear open-minded whether they are or not, and they make efforts, too, the best ones. I think probably I wouldn't be any better; I mean, they are trying to stay open and listen. But the economic and social pressures that are brought to bear on them make it extremely difficult to think straight. The prevailing mythology in the culture is in accord with Conger's view that we have an infinite scale to work on and that development is

something that has to be gradual and sensible, but it is inevitable--what can you say? Well, it's not inevitable. Look at the Dark Ages; that would be a terrible example [laughter]. We need a model of a productive retrogression, and I still think we could come up with one, but the kind of values that we were trying to--or that I at least was trying to think my way through--sound completely wacky and alien to someone like a Homestake executive.

Jobs versus Songbirds

Baker: If you start talking about respect for other species on the planet--I said to Jack Thompson once, "Your report here says that you're going to destroy the habitat of some 5,000 songbirds."[1]

And he said, "It's unfortunate, but there's really no alternative." I understood fully that on his scale 5,000 songbirds is not worth one worker's job, from that perspective. But from the perspective I was working my way toward, it was worth maybe a number of jobs. Maybe we're too addicted to the notion of a job and that we'll drive the bulldozer no matter what the object of it is. You can't blame the bulldozer driver because his world has been devised and set up in such a way that you can't think of another way to function. Most people cannot think or function without a job because we don't have any more really self-reliant and self-sufficient farms. They're all dependent on the economic fabric.

So that mythology is in place and it's very powerful, and if you try to substitute another one--if you start to talk about whole biological systems and trying to look at the future in terms of thousands of years and not decades, you've gone off into fruitcake land as far as most of them are concerned. A lot of these thoughts were, of course, just to myself, and I never take that line publicly except in terms of an occasional allusion.

Swent: That's what gave you your strength, your ability to hang in there.

Baker: Yes. My ultimate conviction was that if we don't sometime reach a point where boards of supervisors look at a big project with a lot of jobs attached to it and say No, thanks, because we're trying

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[1]Jack Thompson, interview in the McLaughlin Mine/Knoxville District oral history project, Regional Oral History Office, The Bancroft Library, University of California, Berkeley, in process 1997.

for a community here above all; we're trying for a kind of way of living on the earth that involves as little of what you represent as possible. Until we get to that point, then things are going to continue on the path that they have, and people are getting conditioned even as we speak to paying less and less attention to the immediate world. In lots of areas the immediate world does literally stink, and it's definitely getting harder to see those hills out there, and there are definitely some weird and devastating viruses loose and there's something bad happening to our infant mortality rate and our sperm count and a number of factors. That's not just New Age alarmism, because as we were saying the other day, we compiled massive amounts of information that ought to be able to deal with these things--and we're not doing it. Instead, we're talking about virtual realities and entering cyberspace and getting into some new version of reality that doesn't carry these uncomfortable smells and shocks and so forth. But from my point of view--it's not that I want to go back to the caves, but we're just talking about going back to an awareness of what else is alive around us and how to live in some fashion with that, that leaves our kids with--not a clean place but an interesting and alive and fertile place where their future will include things like--I was thinking walking over here--who was the old Nature Conservancy [Sierra Club] head? Some old-time Berkeley environmentalist. Dave Brower? Yes, David Brower. He said when he was a kid--he's eighty years old now or getting close--in Berkeley the salmon still ran up Strawberry Creek, that little creek that runs through the campus here. I've been aware of it in other parts of the West, things that I took for granted and saw--clear-cut and the streams are dead--there's nothing or very little. I just think, God, I took that for granted, and I really want my kids to know what that was about.

Swent: I don't want to divert you--

Baker: I've gotten off the subject.

Swent: No, that's the subject, all right, but we haven't mentioned the specific organizations that grew out--

Baker: Yes, I saw you have YCPC [Yolo County Planning Commission] down there [on the notes].

Continuing Citizen Activism

Swent: You had mentioned CPC; that's the Yolo County Planning Commission, YCPC. [looking through notes] I think there were a couple of others here, too. There was the Concerned Citizens of--okay, here we are. Cache Creek Basin Resource Coalition.

Baker: That's the one I was telling you about. That's the current gravel mining--Cache Creek Coalition, I just called it. I forgot the--.

Swent: And they are holding the ground against the gravel mining.

Baker: Yes.

Swent: Then George Stevens organized something called--or was the contact person of something called Concerned Citizens of Capay Valley.

Baker: That was a very early title we had. I remember that name. But we went on to something with CPC in it.

Swent: There was something you thought--Coalition of Concerned Citizens, maybe that's that.

Baker: Yes, that's how it started, but we changed our name [chuckles].

Swent: There was something called the Friends of Cache Creek.

Baker: Yes, that's a different--that's later.

Swent: That's still there?

Baker: Yes, that's still in operation. But the other one, the one we ended up with, was not the Concerned Citizens of Cache Creek. It was something like Citizens for Agricultural Preservation or--it seems to me "Yolo" was in it. I don't even remember. We did have a name that we gave--

Swent: The reason that I think this is important is that there have been succeeding generations of groups which still exist; these things don't die.

Baker: The people don't change [laughs]; they are still the same people involved.

Swent: And other people come in as well; I'm sure there are younger and newer residents.

Baker: Cliff Cain. I'll call him tonight and ask him because he'll remember what the name of that was.

Swent: But what you did is still reverberating out there. There are still groups that--

Baker: Yes. Not all of it good. Many people in the valley, I think, have written us off as environmental nuts.

Swent: Some people called you "The Silly Seven."

Baker: Oh, yes.

Swent: I'm trying to think who the seven were. Was Stevens one of the seven?

Baker: Yes, I guess he was.

Swent: I think maybe he was the seventh. We were trying to think yesterday--

Baker: He's moved out.

Swent: George Stevens, is it?

Baker: Yes. He's since moved away.

Swent: Robert Speirs, Avery Tindell, Will Baker, John Ceteras,[1] Frances Looney, and Clifford Cain. That would be seven.

Baker: Actually we always thought of John and Gretchen Ceteras, Grace and Avery, David and Frances Looney, Cliff and Marian Cain--

Swent: They were the core of the group, the ones you could count on.

Baker: They were one unit in the center that we didn't differentiate.

Swent: Was your wife involved as well?

Baker: I wasn't married then.

Swent: She wasn't in the picture at that point. So the fallout has been, I guess, the monitoring.

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[1]John Ceteras, interview in the McLaughlin Mine/Knoxville District oral history project, Regional Oral History Office, The Bancroft Library, University of California, Berkeley, in process 1997.

Baker: Yes, that. And we have a sort of--it's not an organization, but we have a community of sorts that we'll muster around these issues, and we're now veterans.

Swent: You've been around the track.

Baker: The good part is we know some of the moves; the bad part is that we're a little jaded now.

Swent: Have any of these people got into political--have any of them run for office and been elected or gotten appointed to the conservation district?

Baker: Jan Lowrey, the son of Lloyd Lowrey, was running the planning commission when we did manage to stop it. He did a very good job of--

Swent: He got himself appointed to that.

Baker: Yes. Twyla [Thompson] appointed him. He was the chairman, so he --well, in this long meeting, he picked the moment to bring it to a vote when there were a couple of people who were obviously uneasy, but they were in a big room and there were a lot of people there and most of them had heard enough about this environmental impact report. You saw some of the things in the letter--they hired a firm that had one of the worst records in this part of the world because of that McClellan mess.

Swent: We should clarify that. This is a letter that you wrote to the editor, criticizing the company--Brown and Caldwell, I think was their name--who had written the EIR, and they had had problems with a previous EIR from McClellan Air [Force] Base.

Baker: And also Homestake's problems in South Dakota. There were lots of things that made people uneasy. These planning commission members knew that the board of supervisors can always override their decision--though in this context, at this moment, if they found it inadequate--on the other hand, it wasn't an irrevocable thing--and back and forth, and I think Jan saw that they were in that kind of queasy bog and might lean our way and he brought the meeting very swiftly to a close and a vote after all this testimony, and sure enough, the couple of doubtful ones went along with it. So we had that one moment of--

Swent: And then you did get this technical review panel stipulation. And some of your group were on that, and I'll be talking with them, so I guess you don't need to go into that.

Baker: They will be more up-to-date.

Swent: That has been a continuation of your efforts. It wasn't all completely lost.

Baker: No, no. From some long view we are keeping alive the chance that--

Swent: What about the university involvement--were any of your students involved or interested in it?

Baker: A few were helpful. Not my students personally, but I mean students from the university. There were some.

Swent: Your teaching was apart from this.

Baker: It would have been unethical to introduce any of that into--my classes have nothing to do with this.

Swent: There was a group on the campus, CalPIRG--it's California Public Interest Research Group--which is not only at Davis but all over the state. But there was a group there that--

Baker: We had some meetings with them--

Swent: --evidently took this on as sort of a project, didn't they?

Baker: They did some work with us, for us. They were, as I remember, a little more conscious of the gravel mining as a context for all this because the farming community is, to some extent, divided, and the division tends to be between the small farmers and the big farmers.

Swent: You mentioned Deseret Farms, which is a large farm.

Baker: Also, see, some of the gravel companies also farm, and they specialize in farming land--I mean, they dig the gravel first and then put the topsoil back. Of course it's lower then.

Swent: But that puts them on both sides of some of those issues.

Baker: Except that gravel mining is much more lucrative than farming, so that farming is a side benefit, and it's politically very advantageous for them. Their stooges can be on the Farm Bureau, they can be supervisors, they can say they are farmers, and that is mainly what they do, but they're doing it on gravel company land. The CalPIRG were more aware of that.

We also had a little connection briefly with people in Nevada City [California] who were looking at the same thing at about the same time. A Canadian corporation was sniffing around up at San Juan Ridge looking to revive a gold mine up there. And there's more of that that has gone on since.

Swent: There was a big article in the paper just yesterday, the front page of the Chronicle. I don't recall if it was Canadian.

Baker: There was one in Sonora [California] just a few years after.

Swent: That one I think is closed.

Baker: Could be.

Swent: Just recently. I think that's the one it said in the paper yesterday had closed.

Baker: Well, they come and go. That's the way that mining is. There's nothing to hold them when it peters out.

Swent: I came across the name Shelford Wyatt, which hasn't been mentioned.

Baker: The curious story there is that he owned a hardware store in Esparto for many years and had a beautiful farm out in Capay Valley. But he's a classic believer in individual enterprise and business, and he's a good businessman himself. And if Homestake was going to put in a reservoir, he was for having the water for the farming community. So he spoke for the project, and he got the support of the Capay Valley Water Users, I think.

Swent: That was another of those groups of farmers.

Baker: Right. But he's an honorable man, and although he was sort of a villain to us at the time because he was a well-known person in the community and he spoke in favor of the mine, of course that grated on us because we were trying to get community support to run the other way. As I said, subsequently he has seen what the gravel miners are doing and how they are operating, so he has ended up on the same side as "The Silly Seven." In fact, he very generously contributed a considerable amount to support the court case against Cache Creek Aggregates, which is a company that wants to build a gravel processing plant right at the mouth of the valley. He installed drain fields and pipelines, sewer systems, for years, so he knows groundwater and he knows about the river and its flow patterns. He and a couple of the other old-timers, they have been invaluable in this whole thing because they

remember, for example, little things like--nobody ever had a problem with erosion around this bridge until they started mining this stretch of the river. Then promptly a couple of the pilings started to wash out. It explained to you how if you lower the river there you build up velocity and increase erosion.

That's another benefit I got out of all this. I came to respect and honor the savvy and the grit of a lot of these old-timers. Finally figured out, I guess, that I wanted--and was actually moving towards--river of Time, after all this is ten years ago now--becoming an independent old codger myself, and kind of liked the idea.

Transcribed by Gary Varney
Final Typed by Shannon Page

Regional Oral History Office
The Bancroft Library

University of California
Berkeley, California

Western Mining in the Twentieth Century Series
Knoxville/McLaughlin Project

Norman Birdsey

METALLURGICAL TECHNICIAN

Interview conducted by
Eleanor Swent
in 1995

Norman Birdsey, 1997.

INTERVIEW WITH NORMAN BIRDSEY

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INTERVIEW HISTORY--Norman Birdsey

Norman Birdsey, mill foreman at the McLaughlin Mine, was recommended for an interview by John Turney, Homestake metallurgist who designed the autoclave system. I interviewed him in the conference room of the office at the mine site on Morgan Valley Road on 17 October 1995.

Norman Birdsey recalls his career as a fourth-generation worker in the mineral industry. Born in 1957, he grew up in Creede, Colorado; his great-grandfather was a speculator in mines; his grandfather operated his own bentonite mine and his father worked in an old silver mine, the Emperious or Commodore Mine. He recalls hearing the "comforting" sound of the crusher at night, playing with his brothers around the tailings dam, and occasionally even going underground and playing with his brothers on an old motor near where his father and uncle were working as miners. When his father died in a mine accident, the uncle began to work as a mill operator, and Norman became interested in processing ores. After graduating from high school he worked as a butcher, served a hitch in the navy and achieved the rating of boatswain's mate, learning valuable skills as an equipment operator before returning to Creede where Homestake was operating the Bulldog Mine. He rose from laborer to mill operator before the mine was closed down, served another hitch in the navy, and was hired at the McLaughlin Mine in 1984. His weekend hobby now is "sniping" for gold in the Sierras.

Birdsey modestly chronicles his rise from laborer to mill foreman, praising the supervision and encouragement of John Turney, and outlining the knowledge and skills he acquired with each increase in responsibility. It is a contemporary story in a longstanding American tradition, includes a loving stepmother widowed and left with five sons at the age of twenty, and ends with an optimistic look into the future after the closing of the McLaughlin Mine.

The tapes of the interview were transcribed in the Regional Oral History Office, lightly edited, and sent to Birdsey in April 1997 for review. He made several minor corrections of facts and returned the transcript promptly. The manuscript was corrected and indexed at our office. The tapes are deposited in The Bancroft Library and are available for study.

The Norman Birdsey interview is one of more than forty interviews which were conducted by the Regional Oral History Office from 1993-1997 in order to document the development of the McLaughlin gold mine in the Knoxville District of Lake, Napa, and Yolo Counties, California, from 1978-1996, as part of the ongoing oral history series devoted to Western Mining in the Twentieth Century. The Regional Oral History Office was established in 1954 to record the lives of persons who have contributed significantly to the history of California and the West. The office is a division of The Bancroft Library and is under the direction of Willa K. Baum.

Eleanor Swent, Project Director, Research Interviewer/Editor
October 1997

Regional Oral History Office
Room 486 The Bancroft Library

University of California
Berkeley, California 94720

BIOGRAPHICAL INFORMATION

(Please write clearly. Use black ink.)

Your full name NORMAN ALBERT BIRDSEY

Date of birth 1 APR 57 Birthplace DEL NORTE CO/O.

Father's full name SAMUEL NORMAN BIRDSEY

Occupation MINER Birthplace CREEDE COLO

Mother's full name JANIS NADEEN NELSON

Occupation HOUSEWIFE Birthplace UNKNOWN

Your spouse SUSAN JOYCE RAYOME

Occupation DENTAL ASSISTANT Birthplace PAGE, ARIZONA

Your children NO CHILDREN

Where did you grow up? CREEDE COLO.

Present community COBB CA.

Education HIGH SCHOOL

Occupation(s) SHIFT FOREMAN IN MINING, US NAVY, MEAT CUTTER.

Areas of expertise GOLD PROCESSING

Other interests or activities METAL DETECTING, GOLD PANNING, AND DREDGING.

Organizations in which you are active

I GROWING UP IN CREEDE, COLORADO, 1995-1975

[Date of Interview: October 17, 1995] ##[1]

Father, Norman Birdsey, a Miner at the Emperious Mine

Swent: We are on Morgan Valley Road in Lower Lake, California, on October 17, 1995. Let's start by telling us where you were born and when.

Birdsey: I was born in 1957, in Del Norte, Colorado. That's about forty miles south of Creede, I think. It's down in what we called the San Luis Valley. My mother was Anna Birdsey and my father's name was Norm Birdsey. We lived in Creede, Colorado, where--it was a silver mining district, and lots of silver mines around.

Swent: Was your dad a miner?

Birdsey: Yes, my father was a miner at the Emperious Mining Company, in Creede.

Swent: How do you spell Emperious?

Birdsey: [spells] Emperious. I'm not really sure; I never really thought about it.

Swent: You lived in Del Norte but he worked in--

Birdsey: No, we lived in Creede.

Swent: But you were born in Del Norte?

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[1]## This symbol indicates that a tape or tape segment has begun or ended. A guide to the tapes follows the transcripts.

Birdsey: I was born in Del Norte because they didn't have hospitals or doctors in Creede, so we had to go forty miles. That's where they took everybody. I guess it was quite a ride back then because you had to go through what they call--I can't remember names--but anyway, they had to go down through South Fork along the river, and it was pretty treacherous in the winter. Lots of stories about how they tried to get people to the hospitals and stuff. So he was a miner--

Swent: Was this an old mine?

Birdsey: This was an old mine; it was an old silver mine. The portals were called Commodore 1, 2, 3, 4, and it was different levels up the hillside. It had probably been in operation--boy--thirty, forty years. I know the owner was a guy by the name of Ty Poxen. He was the owner of the mine. As a kid I remember the mill used to--went into town and I remember they used to bring the ore down on the dump truck, and take it to the mill which was at the end of town. So they'd bring it down the canyon from Commodore, and the workings up there, and they got it downtown and John Wardell and Bobby Wardell were the truck drivers. I remember as a kid, we'd stand out there and have them honk the horn and stuff as they went by.

Swent: Just one truck?

Birdsey: Just one truck. One dump truck.

Swent: Small mine.

Birdsey: Real small. And they'd take it down and drop it off at the mill, and on quiet days you would actually hear them dump the ore into the crusher; you could hear the crusher running. I remember at night, when it was quiet, it was kind of comforting because normally you'd hear the crusher running, chomping up the rock, and when you didn't hear it, I remember, it kind of made me uneasy, because something wasn't right--the mill was down or something wasn't right. You kind of got used to hearing that crusher at night, crushing when it was quiet out. This was when I was a little kid; I remember that: laying there in bed and listening to it.

Swent: I grew up with stamp mills and they said the same thing, that if the stamp mill stopped everybody got worried. [laughter]

Birdsey: [laughter] I remember as a kid we used to--when I got a little older--we used to play in the old tailings dam at the end of town, and we used to go play around there and watch them--

Swent: You didn't swim in it?

Birdsey: No, we didn't swim in it. There's a lot of things that you do back then, and I don't think you're really allowed to now. I remember my mother and father got a divorce when I was about five, and there were times when either dad couldn't get a babysitter, or whatever, and I remember him taking us underground, and he'd be working overtime, so he'd take us underground, and put us off in the heading. He and my uncle would go under and do what they had to do; whatever they had to do at the time, and then take us back out. Nowadays, you wouldn't be able to do that.

Swent: You'd sit there for the whole shift?

Birdsey: It wouldn't be a whole shift; it would be just on the weekend, or something like that when they had to do a little bit of whatever they had to do. They'd take me and my brother down and give us some light, and we'd just sit back. It would only be maybe a couple of hours. But just the thought of doing that nowadays; you don't do that. It was interesting.

Swent: What kind of equipment were they using?

Birdsey: At the time, I never got to see because he worked up in the raise, and I remember he'd tell us not go past the heading, because maybe the rocks would fall down and hit us. So I was sitting back on an old motor--that's what they call it, to bring the ore cars up from underground. We'd just sit there, and we'd play on the motor, trying to get it started. We had this little lamp. I'd see him and my uncle go up; every once in a while rocks would fall, but nothing really big. I was a little kid; I expected boulders to come down, but nothing really big came down. But you'd hear them working up there. So he took us underground; I could remember two times for sure, maybe more. They may have slipped my memory now. It was interesting. I remember one time, before my mother and father got a divorce, he took us all back underground, and mom lost the diamond out of her wedding ring. I remember thinking that it would be interesting if one day we might find it. I was a little kid, of course, hoping we might find it.

Swent: She was underground with you?

Birdsey: Yes, we all went underground for something; I can't remember what it was. I just remember I was very small. I remember she was very upset because she lost the diamond out of her ring. I remember thinking when I was kid that somebody might think it was

a diamond mine or something if they found this diamond. We lived a pretty normal life--

Swent: Tell a little more about the mill. Did they crush all the time then?

Birdsey: Yes, they crushed all the time.

Swent: Even with just one truck going back and forth?

Birdsey: One truck, yes. They just put it in an ore bin, and I'm not sure exactly how it was fed. I remember the first time I was in the mill, Mom and Dad were still married, and I was small enough that Dad was holding me, and I remember walking in--and I don't know if it was the crusher we were looking at--but I just remember this big, huge wheel--the sheave, I know now--with a big, old rubber belt. That thing must have been a foot and a half wide, maybe. No guards; just sitting there flapping, and it was really noisy and I was really scared, and I wanted out. I remember Mom walking up and laying her hand on the rubber belt to show me that nothing was going to hurt me. I remember them carrying me around the mill, and it was the flotation--what I know now as a flotation cell--at the time I didn't know what it was. One of the old mill-hands up there, his name's Toughy Lambert, who, later I worked with--Maynard was his first name--who I eventually worked with for a while with Homestake. I remember him sitting up there, and him teasing me that he was going to throw me in the float cell. Started my fear all over again. The second time I was in the mill was probably after my father died. He was killed in the mine he worked in. We'll get to that later. I remember going in there--and what it was, it was a crusher, and it went down to a cone crusher. You got a crusher feeding a cone crusher.

Swent: The first was a jaw crusher?

Birdsey: A jaw crusher. Then it went down to what I believe was a cone crusher. I wasn't still too familiar with mining equipment. I believe it was a cone crusher, and from there it went to a--a ball mill was one, and I think there might have been a rod mill there, but I'm not really sure about the rod mill. But there was a ball mill, and it was ground into flotation. Normal flotation.

Building the Tailings Dam

Swent: And thickeners?

Birdsey: There was no thickeners. It was gravity fed; it was up on a hill and it was all gravity fed. I remember what now I think is very interesting--back then it was just an everyday occurrence--the mill was on one side of the hill at the end of town and there was like a canyon that went across to where we had the tails dam. The tails dam--there was a big, wood trestle, and that's not there now, because that blew it down probably 1970, 1969. The trestle blew down; it was a big, huge trestle. But anyway, the pipeline from the tails ran across this trestle through lines, then I remembered, that's how they made the tails dam: they had a trailer with these cyclones. I don't know if you're familiar with cyclones or not--

Swent: Sort of.

Birdsey: --the underflow of the cyclone is what they would use to build the sides of the dam as they drove around in a circle. The sands would come out and pile up. That's what they made the sides of the dam with, and the overflow of the cyclone shot out into the center, which was more liquid. So you had the heavier solids coming out of the bottom building the dam as they drove this around, and then the lights, or the overflow, put out there in liquid, and that's how they made the tails dam. It was a pretty common occurrence to see--I can't remember the guy's name now, but he's always the same guy out there driving that truck; we used to wave to him and stuff.

Swent: So he drove it?

Birdsey: Yes. It was a truck, and the trailer was hooked to the truck, and the cyclone was on it, and he'd just run around the dam, and then I guess he'd come in and make a road, and he just kept building it up, and it kept spraying water out the center. I'm sure it wasn't water; water-type stuff. In those days, it probably didn't have to be. I remember seeing that out there, and watching it.

Swent: Would be fascinating to watch.

Birdsey: I remember growing up, sometimes they closed the mill down, shut it down for some reason, and Dad would be without work for a while, so we'd do other things. He'd work for the Forest Service, part-time jobs and--

Swent: Do you have any idea how much he made?

Birdsey: I sure don't. I don't have any idea.

Swent: Just wondering.

Birdsey: I remember seeing some contract sheets when he was on contract in the mine. I'm trying to remember how much it was; I can't really remember.

Swent: Did you have a company house?

Birdsey: No. We owned our own house.

Swent: What kind of work clothes did he have?

Birdsey: Used to be Levi's and lots of flannel shirts. They were plaid and stuff like that. He was also a carpenter; so he was an underground miner, and I remember him taking work to putting cribbing and stuff like that around the underground mine. They used to make cribbing to keep the dumps; they'd bring the ore out of the waste, they dumped in the cribbing, and they would have to crib it up, because it was in big, huge canyons, so they actually made--where all the buildings and stuff were was actually dump, and they built cribbing. I remember him building sheds and stuff for them; taking us up and watching him. We used to go out and play on this old trestle. They used to bring ore cars all the way up to the mine at one time; and they had the old trestles and the cribbing and stuff along the canyon with the railroad tracks they no longer used, but we were kids and we'd go up there and play on those trestles while Dad was building the sheds. I think one time he worked on an ore shed. What they'd do: they'd come out and built this big ore shed where the train cars would come in and dump, and then the dump truck would pull out, and they just had these ore chutes; they'd open up and all the ore would go into the truck. All they were was just wooden chutes; they'd slide up and allow the ore to gravity-feed into the truck.

Fill the dump truck up, and they would close the chute, and Bobby would take it into town to crush. Another interesting thing about it was they had a little loader--man, I don't even know what type of loader it was. So at this end of town, they'd drive it out of the canyon and bring it all the down to the far end of town, crush it; the concentrate, then, would be loaded into the same dump truck. When he was headed back up to get another load, he'd load it with concentrate, and they would back up to box cars. They had this little loader, and I used to watch them drive the loader into the back of the truck and they'd load these box cars full of concentrate. That's how they sent the ore

out of town--was on railroads. The railroad came right into town.

Swent: So the concentrates were shipped out to--

Birdsey: --to a smelter--I'm not sure which smelter it was. When we were kids we used to watch him, and every once in a while--I remember two or three times--it was exciting for us kids--I'm not sure the operator was so happy--but he'd miss--every once in a while the motor would be wrecked or something, and it was something exciting at the time. That's pretty much how we grew up.

Father's Work in the Mine

Swent: I was going to ask a little more about what your father wore. Did he have safety boots?

Birdsey: His mining equipment was rubber mine boots; I do not know if they were steel-toed; I imagine they were but this was back in pre-'66. It was '63 or '64. For mining equipment he had: rubber boots; he'd wear Levi's and a shirt; he had a hard cap with a lamp that you hooked onto it, and a battery and a light. He'd come home every night, and I remember we kids used to take turns --he used to have a battery charger for his light, and you'd have to slide the light in there and turn this thing, and take the light, and we'd all get to put on the charger. I remember he'd always make us mud balls out of some kind of clay he worked with underground; he'd make little balls, and when he had lunch he'd let them sit there for a couple days in the sun so they'd get really hard so he'd always bring us these marbles home. When we were kids we'd play with them.

Swent: What about lunch? He carried a bucket then?

Birdsey: He carried a lunch box; it was a plastic lunch box like you see nowadays. Peanut butter and jelly sandwich was his favorite, and he always had an extra one when he came home to share with us. Oranges were his favorite fruit. Peanut butter and jelly and oranges, and coffee. That's what he used to take to work. I remember for a while they used to come and pick him up in the company truck; it was an old pick-up that had tin sides--like a camper shell--only it was made out of tin. They'd come by and pick all the miners up, and take them up the hill, and then they'd drop them off--that's another thing I just remembered: in Thanksgiving they used that old ore truck and filled it full of

turkeys and brought turkeys around to each of the families, which was interesting.

Swent: Really?

Birdsey: But he'd go to work in that old truck--

Swent: What time of day? What sort of shifts did he work?

Birdsey: He worked all day shifts that I remember. I don't remember him working the graveyard [shift]; he worked some weekends, depending on overtime. I remember--I can't remember how old I was--he had an accident there one time, and I remember it was really strange because I remember waiting for him. Me and all my brothers--I had three brothers--and we'd go out and wait for him to come home in that truck, and I remember the truck came by and he wasn't on it. Mom wasn't home at the time and I really didn't know what was going on. What ended up happening was: he was underground and he was setting up a blasting pattern, and he'd taken the blasting caps and set them up on a rock and a slab in the overhead fell off and landed on the blasting caps and blew up, and he couldn't see--his face--he was full of rocks from the blast, and he walked out of that mine. He couldn't see, but he had worked it enough that he knew just by feel--he walked most of the way out before he got help--

Swent: He was working alone then?

Birdsey: He was working alone, yes. I don't know how common that was back then; I don't know if they worked in pairs or not, but I believe he was working alone at that time, because I remember him saying that he had to walk out. For years after that I know he was pulling rocks, and he'd be sitting there and rocks would be working out of his body; small rocks from the blast. He always had a really bad spot in his mouth where a rock had gone through his cheek and did some damage to his jaw; I guess the bone fragments would work out once in awhile. It's not a pleasant thought, but we would be sitting at dinner, and he would say, "Oh!," and pull out a little small bone fragment out of his mouth.

Swent: Oh my! Had they taken him to a hospital nearby?

Birdsey: What they used--they had an old station wagon, the ambulance, that was kept up at the mine, and that's what they did: they loaded him up in the ambulance. Usually, it was such a small town that if anything happened up there, everybody knew about it instantly.

Swent: Of course.

Birdsey: So, protect the kids and stuff; as kids we wouldn't hear much about it. I'm not very good at what year this ambulance was--it was a big, old, white station wagon with one red light on it. They took him out in the ambulance and took him down to Del Norte. They had a county nurse--I'm trying to remember her name --she was school nurse, county nurse--Dorothy Steel was her name. She was the one that took care of him; they called the county nurse, and she'd ride down to the hospital.

Swent: He was in the hospital for a while?

Birdsey: He was in the hospital for quite a while because I remember them taking me up and holding me up to the window so I could look in and see. We weren't allowed in the hospital, but they'd take us around to his room. I remember him coming home, and he had to wear patches on his eyes for a while because of the blast, but then he went back to work.

Swent: He got his sight back?

Birdsey: Yes. Everything was back. He never talked too much about his injuries, but he seemed to be okay. He was an avid fisherman and that didn't stop him. So, I never saw him come and get off the truck, so that was one little memory that popped in about that.

Swent: Pretty powerful memory.

Birdsey: Then my uncle started working with him. He graduated from school and they started working up on Commodore Five, I believe was the name of the level they were on. They were driving their own raise; they called it the Birdsey raise, because of the last name. They worked on it for probably a year--a year and a half.

Father's Fatal Accident

Swent: Is this like a leasing arrangement?

Birdsey: No, this is for the--

Swent: Contract.

Birdsey: --contract mining company; they were driving the raise up. I'm not really sure what happened--I'll tell you what I think happened: they drove the raise--they were a hundred and sixty

feet up, and they drove the raise, and now they were starting a stope off the raise, and they put up what they call bulkheads, and I guess that was to keep the fly rock from coming back down and knocking the timbers down they'd used for support--cribbing and stuff up the raise. They set some powder off, and the powder didn't burn; it didn't go off, it burned or smoldered or something. Anyway, it created a poisonous gas and when they pulled this bulkhead apart, the poison gas come out and overwhelmed them, and knocked them out, and they fell down the raise--both my uncle and my father. My father fell all the way down and was killed instantly when he hit the ground; and my uncle--he bounced down the cribbing, down the support, and got his foot hung up on one of the pieces of wood, and it saved his life. He didn't die, but he hung upside down. That was in 1966; that's when my father was killed. I remember that day the same ambulance--and I knew something was wrong that day. My uncle never went back underground again. He went to work for the mill as a mill operator. My first interest in milling actually started from there with my uncle.

Swent: Was he injured badly?

Birdsey: Yes, he was injured pretty bad. He had a broken neck, a concussion--the worst part was his leg--when he caught he dislocated the ankle, the knee, and the hip and he hung upside down for a long time, and he was kind of spinning. So it did a lot of damage to his leg, and he can walk, and we always kind of tease him now because he has to wear a big super-nylon type material to squeeze his leg together because if he's on it for a long time, it swells up and gets out of shape from the damage. So we tease him about wearing pantyhose and stuff like that. [laughter] He survived it, and he never went back underground again. He went to work in the mill, and that's when I first--actually by talking to him I got interested in milling.

Swent: Did you go to school there in Creede? Was there a high school?

Birdsey: Yes, there was a high school; there was a kindergarten through twelfth--actually it was first grade through twelfth, they didn't have kindergarten. My senior year, from kindergarten through twelfth, there was eighty-four kids total. It's kind of amazing because in a small town like that--I grew up all the way through first grade all the way through high school--we kind of ended up being more like brothers and sisters than just friends. Most everybody I grew up--their parents were miners; they worked at either Homestake or Emperious Mining Company. Emperious closed down--probably around '69 or '70, and they were bought out by Chevron, I think, and then it was sold to Western Pacific or something. Some mining company--I'm not sure--they did a bunch

of stuff. Actually, I think the final closure was probably around 1970s. They finally closed it down and Homestake came in in '66. As I remember, my dad was trying to decide whether to go to work for Homestake or stay with Emperious. He had a lot of people calling him wanting him to go to work, and a lot of his friends that had worked at Emperious had gone to work for Homestake. I remember lots of discussions: if you want to stay with Emperious or stay with Homestake, and he never went to work for Homestake, he stayed with Emperious.

Then my father after he died--

Swent: How old were you then?

Birdsey: I was about eight or nine.

Swent: When he was killed?

Birdsey: When he was killed, yes.

Swent: And your mother had left--

Birdsey: Had left. In that time frame my father had married my stepmother, Janis Nelson, or Janis Brown at the time. He had married her, and then he was killed, so she was left with five boys, and I think she was like twenty, and she had to raise these five boys by herself. But she kept us, she raised us--beautiful. Great mother; great person. Then she married in '66; Homestake came in, and a lot of the miners from Grants and everybody came up to open up the mine, and she met a miner from Grants named Jack Nelson, and ended up getting married to him. He brought three children into the family from his previous marriage, so we ended up with eight kids there at one time.

Swent: Were the five of you all--

Birdsey: No, just the four of us.

Swent: I see, so she had one?

Birdsey: She had one of her own. It was just a little baby--Terry was just probably six or seven months old.

Swent: Five boys.

Birdsey: Yes, she had boys. Then Homestake came in, and I remember where they were putting in where the houses were where the Robertsons lived and stuff up there. I remember when they were putting those houses in, they were trying to lay sewer lines and stuff,

and they had to blast into solid rock to put the sewer lines in, and we'd go up there as kids--there used to be nothing up there but the graveyard--we'd go up there and we'd watch them drill. It was like being underground. We'd watch them open the prill, and they'd let us help. We would grab handfuls of prill, which is an explosive agent they used underground. They'd let us pour them down in the hole--we were kids. [laughter]

Swent: This was all before OSHA, wasn't it? [laughter]

Birdsey: Yes, I think it was. [laughter] Now and then they'd be setting off blasts; no horns, no alarms, they'd just tell you to get back--they'd make sure all of us kids were out of there.

Swent: I'm guessing that you obeyed knowing that it really was--

Birdsey: Oh, definitely. One of the biggest faux pas a person could make when they were small was to get caught playing around in the old mines, and there were old mines everywhere--old tunnels and stuff. It always amazed me that you could be out there playing around in one of those things and before you got back to town your parents knew about it. As kids we were taught--I was taught really young--I knew what a blasting cap was, I knew what primacord cord was and not to touch it, and not to play with it.

Swent: You knew it was dangerous. I was just thinking when you said your dad took you in the mine and said, "Sit there, and don't go there," and you knew better--

Birdsey: Exactly. They taught you about the primacord, and blasting caps.

Swent: And not falling in old mine holes.

Birdsey: Exactly. And not to go underground; I knew about gas--bad gas and stuff like that. My grandfather was also a miner. We have pictures when he was very young of his mule and his horse, and his ore car.

Four Generations of Miners

Swent: Your father's father?

Birdsey: My father's father.

Swent: This is in Creede also?

Birdsey: This is in Creede also.

Swent: Was he Cornish?

Birdsey: Well, it wasn't really Cornish; it was pictures of him when he was a little kid underground--not a little kid, but fifteen, sixteen maybe.

Swent: Do you know where your grandfather was born?

Birdsey: Yes, he was born in Creede--around the Creede area there somewhere. He used to talk about when he was a kid--when the old prospector turned the mules loose, they had a whole bunch of wild burros--he was talking about when he was a kid and he and his brother, my uncle, would go up and catch these mules in the summer and use them all summer, and then turn them loose again in the winter. I'm not sure which mine he even worked at; there was so many mines up there: King Solomon and a whole bunch of them. He worked at one of them when he was a kid, and so did my great-uncle. In fact, my great-uncle died from consumption, or black lung, or whatever you want to call it nowadays.

Swent: Miner's con [consumption].

Birdsey: Miner's con; there you go. My grandmother's father had something to do with mines up there. He either invested in them or--because I remember talking to my great-grandmother--Grandma Virge we called her--she died when she was ninety-eight--she used to talk about her husband was a speculator or something for these mines. She talked about when she came to Creede, she came in on a wagon. We used to talk to her a lot about the train.

Swent: Was his name Birdsey also?

Birdsey: No, his name was Alspagh. That was my grandmother's father.

Swent: How do you spell that?

Birdsey: I'm not really sure. He was a mining speculator; I'm not really sure. Anyway, then my grandfather opened up his own mine. It was a bentonite mine and--

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Birdsey: --old clay mine; right there on the airport corner. It used to be the airport corner and an old mine sits there. What it is, is an old ore bin where they used to dump the clay and my grandfather built that, and that's where the mine was.

Swent: Was that underground?

Birdsey: That was underground also, yes.

Swent: What did they use bentonite for in those days?

Birdsey: They were lining some reservoir; they were using it for water proofing and reservoirs. I guess it's like a clay, so they were lining some reservoir, and I guess he had a contract to sell it, and they started this. I remember when I was kid--we weren't supposed to do it--but they covered in the portal, so you couldn't get into it, but up on top they drove a ventilation shaft, and my brother and I found out where that ventilation shaft was, and we used to try to climb down. We never made it all the way in. You got down to one spot where there was a ladder, and it was loose, and we were afraid that we were going to fall, so we never did. We weren't supposed to be playing around there; but we used to climb down there, and we never made it down the sides. There were mines all over that place.

Swent: Did your father finish high school?

Birdsey: Yes, he did. He graduated there in Creede. I think he wanted to go into the military, but he had shot himself when he was a kid when he was out rabbit hunting. It had gone through his arm and it damaged his nerve, and he could not hold his hand out right because one of the nerves was damaged, so he didn't pass his physical. So he went to college and became a gunsmith, and he had a country-western band also. That's what he did through college, and then he moved back to Creede and went to work in the mines.

Swent: You finished high school there?

Birdsey: I finished high school there, and then I had a chance to sit back and think. I used to cut meat at the local grocery store. I started working at the store when I was in the eighth grade there at Kentucky Belle--that was the name of the store, and I cut meat as a meat-cutter and a clerk, and whatever they needed, basically, until I graduated out of high school.

Swent: What were paid for that? Do you remember?

Birdsey: Yes, I was paid $1.25 an hour when I first started. When I graduated from high school and I quit, I think I was making four bucks [$4.00] an hour.

Swent: That's pretty good.

Birdsey: That's pretty good, yes. I was making good money. Then of course, on the side, out of season, we made quite a bit of money--we had to wait until after store hours because it's against the law to cut wild game during the store hours, but after store hours you'd cut it. So we used to cut deer and elk, and we charged seventy-five dollars an elk, and forty-five dollars a deer. So, we made a little money on the side doing that. Then one day I was sitting there wondering what I was going to do. I had graduated from high school, and I had a job there, and this mining--mines were around--but I decided that I wanted to see more of the world, and what better way to get started than to join the service? So I went into the United States Navy in 1975, and was in the navy until '79.

II AN INTERLUDE IN THE NAVY, 1975-1979

Marrying a Girl from Oroville, California

Swent: Where did you go in the navy?

Birdsey: I went to boot camp in Great Lakes, Illinois, and was stationed in San Diego, California, on an LST; landing ship. I went all over the western Pacific. I was in Hong Kong, Korea, Singapore, the Philippines--all over in the western Pacific.

Swent: '75 to '79?

Birdsey: '75 to '79.

Swent: Just at the end of the Vietnam War.

Birdsey: Right. In fact, when I picked up the ship, they were just coming back from the evacuations of Vietnam.

Swent: What was the name of the ship?

Birdsey: U.S.S. Barbour County; LST 1195. That's where I met my wife--was in the navy. I met her through a letter, actually. I had a girlfriend back in Creede, and being in the navy and stuff, of course it did not work out. I had a good friend in the navy, and was talking to him one day, and I asked him if he had any friends I could write to. He said, "Yes, my girlfriend has a friend,"--it happened to be my wife--but I sent her a letter. I said, "You don't know me. My name's Norm, and I know Rick." So she wrote back, and we started writing, and I was overseas at the time, which was a nine-month deployment, so we wrote back and forth for nine months, and I asked her if she'd like to come down and meet me at the ship. She said, "Sure," so she came down, and it was love at first sight, and we ended up getting married.

Swent: And it's lasted?

Birdsey: And it's lasted, yes.

Swent: Isn't that wonderful?

Birdsey: Yes, it is. I got married in '79. It was one of the good things I got out of the navy.

Swent: Where was she from?

Birdsey: She was from Oroville, California, right up here. It's right up the road here. Then I didn't know what I was going to do so I went back to Colorado, and I started cutting meat at this store in Grand Junction--actually, it was in Fruita, Colorado--I was a meat cutter. I worked there for about a month and a half--two months. I soon realized that the store owner and I were not seeing eye-to-eye on a few things--

Swent: Let me backtrack just a bit: what was your rating in the navy?

Boatswain's Mate, Second Class, an Interesting Rating

Birdsey: I was a second class boatswain's mate.

Swent: Did you learn any skills from that that helped you at all?

Birdsey: Yes, actually, I learned how to paint. Boatswain's mate was a very interesting rating. When I first went to school in the navy, I was going to become a gunner's mate. A lot of things played into this--I was out on my own for the first time--I grew up in this small, small town, and all of a sudden I was in Chicago, Illinois--very, very, very, very homesick.

Swent: I'm sure.

Birdsey: Not understanding the city life at all. I felt like I was the only person in the world. Needless to say, I didn't do very well in school, and then I started finding out about night clubs, and to be honest with you, I started drinking a little bit. When I should have been studying, I was out partying, and it didn't take the navy long to say, "Hey, you're out of here." So, I lost the schooling for--

Swent: Had you done well in high school?

Birdsey: I had done fairly well in high school, yes. I could say I was in the top ten because there was only ten of us. [laughter] I

carried probably about a B-average in high school. I attribute it to being young, and stupid, and homesick. Anyway, I lost my position in the gun school, so they sent me out to the fleet. They said, "You get out there, you can strike for anything you want; when you mature a little bit more, find out what you want." So, I went out there, and they put you out on deck force, which is what everybody starts, painting, swabbing decks and stuff. I started liking it because there are other things that a boatswain's mate rating leads to--it's kind of like things you see sailors do: I got to steer the ship--I thought that was just great; standing watch with the spray hitting against you. Sometimes I thought, "Wow, this is all right." There were other jobs: there were cooks, and radarman, and gunner's mate stuff, but this seemed to be what the navy was like.

Swent: Real sailing.

Birdsey: Right, real sailing stuff. Then we started doing replenishing at sea, and they sent me to school to learn how to land helicopters and guide them into the ship, drive the landing craft up on the beach. I enjoyed that so I stayed in that rating. There's a lot of things that helped me out a lot. The biggest thing that helped me that would relate to mining would be operating a piece of equipment. Every type of equipment is basically the same: you have to start it, you have to run it, you got to shut it down.

Learning to Operate Equipment

Swent: And know what to do when there's trouble.

Birdsey: Exactly. So, even though I was running winches and cranes, and driving a boat, it all kind of gives you that basic for operating. How to run a piece of equipment; be it a loader or a 24-foot SAG mill. So I guess that helped me in mining. So I got out of the navy, and I went to work there, and it didn't work out, so I thought I'd go to school and use the G.I. Bill [Serviceman's Readjustment Act of 1944], but my stepbrother was driving up to Creede to see if he could get on as an underground miner. I rode up with him that day just for something to do; I'd already quit, and I didn't have a job.

Swent: In Fruita?

Birdsey: In Fruita, right. My brother was working for a company called Crest Motors delivering mine equipment and he was tired of it, and he wanted to see if he could get on at Creede, and I didn't

have anything to do because I had already quit. So I decided that I would go ahead and ride up with him; what did I have to lose? I could see my parents while we were there. When we drove up to the mill while I was there, I decided, "Ah heck, I'll just throw an application in and see what happens." Well, it just so happened that they needed somebody and they hired me that day.

Swent: Were you married already?

Birdsey: Yes, I was married; Sue was there.

Swent: How did she feel about that?

Birdsey: Actually, I think my wife was still in shock with being in a small town, but she was happy that I got a job because she was worried about me quitting, and we were young, and you know how we all start out when we're young. Not too much in the cupboard. So she was pretty happy that I got a job, and that's where I started my milling career--

III BACK TO CREEDE AND A JOB WITH HOMESTAKE, 1979 TO 1981

Entry-Level Laborer

Swent: Back in Creede [Bulldog Mine].

Birdsey: Back in Creede.

Swent: Where did you live?

Birdsey: When I first moved there, my parents had some property near town that my mother had inherited from her father. They had a little trailer--a camper trailer--and they rented that to us for twenty-five dollars a month until we could find something; something to rent in Creede. So we lived in that camper trailer and had all our stuff in storage--we didn't have much at that time. We moved there and we lived in that trailer, and I started to work at Homestake.

Swent: They'd been there for ten years, but you had not ever worked there before?

Birdsey: Never worked there before, no. I had been working at the store, and I had been in the navy.

Swent: How much did they pay you there?

Birdsey: There, I was getting $6.00 an hour as a laborer.

Swent: Entry level?

Birdsey: Entry level, yes.

Swent: Were there benefits?

Birdsey: Yes, we had medical and dental and eyeglasses, I believe.

Swent: Was there a dentist in Creede?

Birdsey: No, there was not a dentist there, you had to go down to the valley forty miles away.

Swent: Everything was in Del Norte?

Birdsey: Everything was in Del Norte. That's where it started, in Del Norte. If you wanted to go shopping, you probably had to go to Alamosa, which is seventy miles away, and the movie theater was in Del Norte; everything was pretty much in Del Norte. I remember starting there, and I remember I was so proud because I had a job, and that made me feel good.

Swent: What was it? What were you doing?

Birdsey: I was a laborer. My first job was--actually I was out with a guy by the name of Jimmy Hosselkus.

Swent: Hosselkus?

Birdsey: Hosselkus, yes. [spells] Hosselkus.

Swent: What was his first name?

Birdsey: Jimmy. It only lasted a couple days, but we were busting rocks on a grizzly. They would bring the ore cars out of the mine, and they'd dump the ore through the grizzly and then it had rocks out there above the crusher. We'd have to go out and bust those rocks. I remember--

Swent: That's kind of dangerous work.

Birdsey: I remember sitting there with that sledgehammer cracking these rocks thinking, "If this is what milling's all about--[laughter] --this is going to be a little rough." But we didn't have to bust for too long because the mine--somehow responsibility shifted to the mine, and they ended up taking care of it. Then I moved in to the crusher operator, and my job was to keep the place clean, shovel up any spilling at the end of the shift, and watch the jaw and cone crusher, because it came up the feedbelt from underneath the camelbacks there in the ore.

Swent: Underneath the what?

Birdsey: The camelbacks, where they dumped the ore cars. It would spill onto the grizzly; big rocks separated, and then it would fall down into the ore pile--coarse-ore pile, over an apron feeder.

Then the apron feeder would feed onto the feedbelt which took it to the jaw crusher.

Swent: Were you given any kind of training at all?

Birdsey: Yes, we were given the three-day MSHA [Mine Safety and Health Administration] training, and familiarization training and stuff about going underground and what to wear and stuff like that because we did have to go underground from time to time. I started with a guy by the name of Doug Hatton.

Swent: Hatton?

Birdsey: Hatton; and he ended up being a very, very, very good friend of mine--still is. He's a general foreman at Barrick right now, in Nevada. He and I started together and he went in and they put him in as a helper, for one of the helpers that had left; mill helpers. And I used to work with Charlie Atencio out on the crusher.

Swent: Who?

Birdsey: Charlie Atencio. He was the crusher operator. So my responsibilities included keeping the floors clean underneath the belts and seeing and watching the cone crusher. What we had to do was: when you had really muddy ore, the cone crusher could take it, so we had to pull this handle--this big rope--we would ring a buzzer up by the crush operator and he's shut the feed off, and allow me to unplug the crusher. Some days that job was great. It would run perfect; if they got a lot of mud out from underground, or they were cleaning one of the sumps from underground, it would be all sticky, and it was just a son of a gun. You'd be there for a day just trying to get the stuff to go through the crusher.

Swent: Did you have a shovel or--

Birdsey: I had an airlance--this airlance--you just jammed it down in there, and tried to blow it through the crusher.

Swent: It's connected to compressed air?

Birdsey: Compressed air, right, and you just turn a knob and keep jamming it down in there trying to get that mud that's hanging up on the side plugging it up to work through. You'd use water; but we didn't like to use a bunch of water, because it weighted the ore down--the ore bin.

Swent: Was this dangerous?

Birdsey: No, it really wasn't dangerous. I remember I learned my first lesson about ore and silica because I had just got my brand new safety glasses--

Swent: Did they provide those?

Birdsey: They provided them, and I just got my brand new ones, and I'm sitting there blasting this stuff out--

Swent: Sitting?

Birdsey: Well, I should stay standing. I'm standing up on this--

Swent: Okay, I'm trying to picture where you're--

Birdsey: Well, a big cone crusher is about four feet tall, and I'm up on the side of the cone crusher bending down, and all this mud is flying back at my face from the air. It's getting on my glasses, so I take my glasses off, and take my shirt tail, and try to wipe the mud off my glasses, when I got them all wiped off, I put my glasses back on, and I couldn't see; I'd scratched them because that silica had cut right in there, and ruined my glasses in about thirty seconds, so I learned my lesson on that. So if you ever work and get mud on your glasses, wash them off with water first. I just tried to wipe it off, and I couldn't even see out of them. I sliced them right up. You'd sit there for hours just trying to get this thing to go, and you wouldn't get any tonnage, and the thing was if you had really good runs and you didn't have to mess around with the cone crusher, you could fill that ore bin up by 12:30, 1:00. Then you could go ahead and do clean-up from 1:00 until, lets's say 2:00, and then you could fire the crusher and everything back up, and top the ore bin up, and you have a full ore bin; enough to last a couple days or whatever. But if you had really bad runs--

Learning a Lesson about Safety

Swent: Then you could relax a bit.

Birdsey: Then you could relax a bit, and get clean-up and maintenance done and stuff; but if you had bad runs, then you were always trying to keep the mill going. It was constant. Sometimes you'd end up working over, and in the winter, it was really different because --Homestake's been a very safety-conscious company since I've worked for them. There was a few times--in the crusher--it'd be winter in Colorado and it would be cold, really cold, and we had

water drip down from the roof or something, and it would freeze on the catwalks, and you would be walking up the belt and you would hit one of those icings, and one time I was walking up the belt, and I had a hammer in my hand because the rollers would freeze--it would be so cold--so you'd have to get under there to hit the roller to break it free to get it to spin. So I had the hammer in my hand, and I'm walking up to knock these rollers free, and I fell and the roller went into the belt, and sucked that hammer right out of my hand and grabbed my thumb through between the belt and the roller which fortunately wasn't loaded and the belt was sticking up, so it didn't really do much but just skin. That taught me a lesson; another lesson to learn!

Swent: But what else could you do?

Birdsey: Well, pay more attention for one thing, and I shouldn't have been on that side of that roller for one thing, I should have been on the other side of the roller. So if I would have fallen it wouldn't have pulled me in, it would have pushed me out.

Swent: I see.

Birdsey: But I was on the wrong side so when I fell, I went in.

Swent: Had you been told this?

Birdsey: Knowing me I had probably been told that, but--technically, I don't know whether I had been told or not, but I imagine I had, knowing Homestake the way I do, I'm sure I would have been told. It's just that sometimes you don't listen; sometimes you learn the hard way.

Swent: You don't understand until you've tried it, I guess.

Birdsey: Exactly.

Swent: But they did give you safety training?

Birdsey: Yes, they did. They gave us lots of safety training: a lot was underground; how to use your self-rescuer--we used to have to go underground probably a quarter of a mile--

Swent: Even as a mill worker?

Birdsey: Right, because we used to pump--they had what they called the sand dam--and we would pump our tails--which is sand--underground so they could use that sand for backfilling the stopes, and the mill was responsible for the line from the mill all the way underground to the first set of valves that was back there. I

really don't know how far underground it was; I'm just saying maybe a quarter of a mile, if that far. We used to have to go underground and hook up an airline and close off the valves blowing the sand down, hook up an airline, and backblow that sand line back into a sump in the mill building, or it would freeze. Then we'd be in trouble because we'd have to take it apart and thaw frozen sand. So we'd have to back blow it so the line wouldn't set up. Then the mine took care of that valve back underground; that was their responsibility.

I hated going underground. I hated it because to get there, you had to go through square sets, and that's just braces that they used for the ground, and the square sets were probably--three-quarters of my trip back was in square sets--and you'd have block lights; they'd be red and green for the motors coming in and out, they'd make them red and green telling the motors. I hated it because we had to walk back and it seemed like every time you'd get there, a train would come out, so what they did is every other eight-by-eight they had removed so you could get in between them and let the ore car go by--because there wasn't much room between the ore car and the side--

Swent: And you're a pretty big guy.

Birdsey: Right. I remember laying there, and the car--you see the ore cars going by like this: zoom, zoom, zoom. One day--

Swent: You were standing?

Birdsey: Yes, you were standing. We stepped in the back as the ore cars go by. I hated it. One day I was sitting there, and usually I stood on one side, because you had more room on the right side going in--you had more room. The left side was really, really skinny. One day, I was on the left side going in when the train came out so I got back up on the square set, and there wasn't quite as many square sets missing on the left side as there was the right side. They had red reflectors that you could see that's where you need to stand. Anyway, I was on the left side, and I could hear this *thunk, thunk, thunk, thunk, thunk, thunk*--and what had happened was one of the ore cars had had a piece of timber in it, and it was going down smacking those eight-by-eights on the other side, and if I had been on the other side--I don't know if it would have hit me or not, but it could have because it was hitting those square sets. I always hated that, so what I used to do is when I saw that the light was red, I'd either stand there until it turned green or wait for the train to come out because I didn't like going back. I had no business back there. It was a different world. Anyway, we'd have to go back and blow those back, so they gave us a lot of training on

underground using our self-rescuer, and we used to have to get a brass tag out of the shift foreman's office in line, and hang it up on the board to tell everybody that a mill hand was underground. Everybody had brass tags--it had an M, for mill--so if something happened, they would know who's underground. I remember one time I forgot to put the brass tag up and I was told about that. You got to learn. I pretty much tried to stay out from underground; I didn't really understand it, or have anything to do with it.

Promotion from Crusher Operator to Mill Helper

Birdsey: Anyway, I worked as a crusher operator, and then they moved me over to the mill as a mill helper. My responsibility there included keeping the floc full in the grinding--

Swent: Keeping the--

Birdsey: --floc [flocculent] tanks full; all the reagent tanks full--all the chemicals we needed for milling. Keeping all that full.

Swent: I think that's flocculent?

Birdsey: Right, flocculent.

Swent: But you call it floc tank.

Birdsey: Floc tank. [spells] Floc. Keeping that full so the con thickener--

Swent: The what?

Birdsey: Concentrate thickener.

Swent: Con thickener.

Birdsey: Con thickener would settle; using all our collectors and promoters, which was xanthate, 404-249--they had to keep that full, and the lime full, and keeping other reagents full--charging the mills with balls, grinding media; making sure the mill is full--charging the rod mill so it was kept full of rods.

Swent: Do you remember the brands of any of these things?

Birdsey: Let's see: our float cells were Gardner-Denvers and they were small; I'm not sure what the rod and ball mill--what brands they

were; we had Galigher pumps, of course--our tails pumps; we had Joy air compressors; I think we had some Wemco pumps, I'm not really sure--

Swent: What tonnage were you doing?

Birdsey: We were running about 320 tons a day, which comes to about seven or eight tons an hour.

Swent: How did this compare with the mill at the Emperious? Was that how much--

Birdsey: I think the mill at the Emperious probably ran about the same amount. Maybe not quite as much. I really don't know. They were about the same size; similar or the same size.

Swent: So you were moving up the ladder?

Birdsey: I was moving up. I went from helper in the crusher to helper in the mill. Crusher operator was kind of a good job to get because it was straight days--five days a week. That was kind of a nice thing, but it was such a small place, that I didn't think Charlie was ever going to leave, so I didn't think I would be moving up in the crusher ranks. So, I went over to mill helper and--

Swent: That was shifts?

Birdsey: That was shifts, yes.

Swent: Around three shifts?

Birdsey: Shifts. Around the clock, twenty-four hours a day. My first shift schedule was a bad one because I was on what they call, relief crew, and on it they didn't work a seven-day rotation; you worked five days, and then you had two days off, and then you worked five days. So, you worked five graves, and then you had two days off; but those two days you were off on graves, the relief crew would come in and work two graves, and then you'd come back in and you'd work another five days of graves, and then you had two off, and then you worked swings, two off, swings, two off days, two off days. On your two days off, that relief crew was constantly coming in, and relieving who was ever off, so on the relief crew you might work two graves, a day, and two swings every week.

Swent: So graves is eleven to seven?

Birdsey: Eleven to seven.

Swent: And swing is three to eleven?

Birdsey: Three to eleven.

Swent: And days is seven to three?

Birdsey: Seven to three.

Swent: So you're body just never got a chance to get used to anything.

Birdsey: That shift was just terrible. Then after you moved up another one, then you got on a crew permanent, so you got permanent shifts.

Swent: That's tough; and your wife was getting used to this too.

Birdsey: Exactly. She was having some trouble adjusting to it.

Swent: Did you have children?

Birdsey: No, we don't have any children.

Swent: Because sleep schedules get a little complicated.

Birdsey: Yes they do, yes they do. It always brought back memories. I remember my stepfather--he'd work shift work. When we were kids he used to yell out the window, "Would you please shut up?" We thought, "Why he is always upset? He sleeps all day, I don't know what's wrong with him." It kind of adds a new meaning when you start working it. That's what's neat about a small mining town: after a while you learn. You hear kids, "Don't go down to his house, he's working nights tonight." You hear your mother saying, "Don't go down to Scott's house. His father's working tonight." It's pretty interesting how that works in a mining town.

Swent: Yes, it is. People help each other.

Birdsey: Exactly. I started working shift work and I learned to operate a mill--the rod mills.

Learning to Operate a Rod Mill

Swent: What did that involve? More than just turning on a switch?

Birdsey: More than turning on a switch. You had to watch that rod mill because you fed off of a belt feeder that fed into the mill. There was a handle you just go up and you crank; it was a clutch-fed, and you cranked this baby, and you run it up--and we had numbers, two, four, six, the last goes one, two, three, four, five, six--and you knew that if you put in about two and a half, it would give you six tons. Then you had a big Foxboro chart recorder. That would tell you how many tons you were running; it came off a weightometer and it would run off this Foxboro chart recorder, and you could tell how many tons you were running by cranking on this belt, by speeding the belt or slowing it down which you fed into your rod mill. It was ground up--

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Birdsey: So you had to watch this rod mill, and watch the discharge. Here we call them the densities; but in Creede we called them gravities--and you had to take your gravities and find out how thick the stuff was coming out of the mill. That's how you controlled the mill--by adding water, and taking water off to get your grind, what they called the grind on the mill. So you'd have to take the density off the front of this mill and you can tell by the way the punch plate was starting to load up with rocks how hard the ore was because it wasn't being ground up, and you'd adjust tonnage to compensate--to keep the grind up. Then you had to run the ball mill--same thing--watch your amperage on the ball mill, and take your densities and your gravities,and make sure the grind is fine.

Swent: These are on a graph?

Birdsey: The chart recorder for the tonnage is on a graph, the density is taken by hand; you use what they call the Marcy scale--it's a one-liter cup and it holds one liter, then you take the sample slurry and you hang it up on the scale, and it feeds out the sides of the Marcy cup to give you one liter, and it tells you what your percent solids are. How much solids you have to water. That's how you control the mill. They'd say, We'd like--on the rod mill I believe it was a 60 to 70 percent slurry coming out. Then the ball mill I think was 40 or 50. Then you'd bring it down to a 28 to 30 percent density to feed the float cells.

Swent: How often did you have to do these readings?

Birdsey: Every hour we had to do a reading; basically just watching the mill. You know, you get those old-timers like my partner, John Wagner, was a great mill hand. He'd been doing this stuff for years, and years, and years, and I think he could actually smell when things were going wrong.

Swent: He probably just knew by intuition.

Birdsey: I remember he used to really go out of his way to help me out. I'd be asking questions and he'd stay over and go over things with me; a very good teacher and a very good gentleman. I remember one day though he got really upset at me: the maintenance crew had just relined the rod mill. That is putting new liners aside, and they have lifters, and I'm not sure if you're familiar with the mill, but they have a lifter in there, and you got a liner that protects the shell, and then you got pieces of metal and there are different styles and different shapes that stick out, and what they do is they pick up the rod and let it drop so it just doesn't roll around inside the mill; it's picked up and dropped. So they got a lifter and a liner--

Swent: What is the lining? Metal?

Birdsey: Metal; solid steel. They're made out of different things, and a lifter is steel. Well, we had just relined it and Toughy Lambert--the guy when I was a kid who I now worked with who was one of the operators up there--was on vacation, so they asked me to operate the mill in his place and they had just relined the mill. So we started it up, and everything was going fine, and we're running some pretty good tonnage right off the bat, and pretty soon I'm starting to get some rocks out on the punch plate, and stuff just isn't grinding good. So I thought, "This stuff is really hard," so I go ahead and back down on tonnage and it works okay for awhile, but pretty soon it starts not working; I'm starting to get more rocks out on the punch plate, and I see how my grind is. So anyway, I'm down to probably a ton an hour by the time the morning gets there--this mill is not grinding.

Old John Wagner comes in--he's my relief--and says, "How's it going, Norm?"

I said, "Not bad, John. The ore's really hard."

He says, "The ore is really hard, huh?"

I said, "Yes, it's not grinding."

He says, "It's not grinding at all, is it?"

"No, it's not."

He says, "Go shut your mill down."

I said, "Why?"

He said, "Go shut your mill down." So I went down and shut the rod mill down.

He handed me a flashlight and he said, "You look in there, and you tell me why it's not grinding." All of the lifters--where there were the two pieces of metal coming out--this would be a lifter here--this is your mill--that's the shell, then you have the liner, and you have the lifter, then a liner, then the lifter, then it's like that all the way around the mill. What happened was--

Swent: They're like cogs?

Birdsey: Right, but only they're long. What that does when this thing rolls: it picks the rods up and drops them. Since they're new, these are nice and tight--they're big enough that three rods would hang up in there. So all my grinding medium is hung up inside; so there was nothing in there to grind. There's a few rods left, but most of them are hung up--

Swent: --between the lifters.

Birdsey: --between the lifters. He told me about that just the day before: he says, "You're coming in; remember those lifters are going to be new, it's possible that your rods are going to hang up and you're going to need to run the mill dry for a while and knock those rods back out." I forgot all about it, so he let me know--taught me a few words--told me how stupid I was. And I felt stupid. But again I learned something.

Swent: And you won't forget it.

Birdsey: Right. [laughter] Seems like when you really get embarrassed, that's the best lesson. So that's what happened, and he picked that up as soon as he walked in, and he knew.

Swent: He probably could tell from the sound.

Birdsey: Exactly. So I learned something in that. I always remembered that; he was a little hot. He taught me about flotation, and he told me what to look for, and he was a really good float operator. When to add chemicals, when not to add chemicals.

I remember another time I was working with John Wagner. I just got in the mill as a helper and part of our job was to clean the change room--the dry--on swings. We had to mop it, and clean the sinks and stuff out. We used Pine-Sol to disinfect with. Well, not being familiar with the float circuit, I took that Pine-Sol, after I got through, I went out and dumped it in the

floor trough in the mill building. The floor trough went to a pump, and that was our recovery water--our mill water--which pumped back in behind the rod mill.

Swent: So you were getting more Pine-Sol--

Birdsey: So I got Pine-Sol into that float circuit, and I just tell you it was everywhere. There were bubbles coming out--I had the whole place full of bubbles. [laughter] Wagner--he's running around; he doesn't know what happened. He's trying to figure out what the heck is going on with this float cell. There are bubbles everywhere. So again I learned a lesson. He was a little miffed on that one too. [laughter] He took very good pride in his circuit; he loved his circuit.

So I worked there as a float operator, and--

Swent: Again: were there any physical dangers to you?

Birdsey: I don't think there were any physical dangers. The one danger I didn't like was--you had to be careful when you had to move the rods. These rods were ten feet long, probably four inches in diameter; solid steel rods. We'd have to move those and load those in the mill, and you had to watch out for your fingers--they'd shift and stuff--and we had to use a crane to pick them up from one side of the building and bring them all the way across the building. You had to watch your fingers because you could smash them and stuff. Then your normal moving equipment and belts and stuff.

Swent: From the chemicals?

Birdsey: Chemicals? We never really used anything up there. The only time I ever really had a problem was: we had our soda-ash tank. We used that for our buffering agent, and it would scale up, and I was working in my rubber boots; I slipped on the bottom of the tank for de-scaling and I fell down and scraped my arms on the side of the crystals that would build up on the side of the tank. Soda-ash is a high alkaline, and I didn't wash them off or anything, and about three hours later, I had some pretty nasty burns on my arms where I scraped them. But that's the only thing that ever happened. The other chemicals and stuff were pretty basic; pretty easy and pretty safe. Over on the CIP [carbon in pulp] side, of course, you had cyanide.

Swent: You had cyanide there?

Birdsey: We had cyanide there. I worked in the CIP area as a relief operator, but I never had to operate it for any given time. So

they told us about cyanide over there and the pH. So that was the only thing dangerous over there.

A Hateful Earlier Job Dredging Tailings

Birdsey: Then one summer--it had to be the first summer I was there--they moved me over on the dredge. In the summer, we had a new tails dam--when the plant was first open in '66, and we were re-dredging that, and sending that over to the CIP side because it had a lot of silver in it and they were using the cyanide to leach it, and strip it, and pour silver bars. So they put me on the dredge to run the tails over to the plant. And the way the dredge worked--it was just a huge boat; we had the dredge arm that came out, and it had these rakes on the front that would scrape, and we'd drive it to the slime layer of the fines of these tailings--

Swent: Was it floating?

Birdsey: It was floating, yes. We used the cables off each corner of the dredge and tied them to separate ends of the ponds by heaving around or pulling on--like if you wanted to go forward, you'd slack off the cables in the back and pull around the ones in the forward, or move the ones on the sides back and forth. You didn't have to move very far because you had the whole dredge and the whole slime layer out there in front or you. We ran off the pressure; and I think we kept it around ten or fifteen pounds, and you just take it, and put the dredge edge down and jam in the slime layer, and keep it up to about fifteen pounds of suction, and those rakes rake that stuff up, and you pump it up over the hill to the storage tank; the big surge tank, and then during the midday we'd fill that up, and then at night, they'd suck out of that surge tank to a thickener where they thickened the slimes and pump that into their CIP tanks, and cyanide it to dissolve the silver, and put it on carbon. So my first summer there, that's what I did; it was only a summer job because the tails dam froze over the winter. First, it was a very fun job, and then I hated it after a while because all you had to do is sit there and run this thing every day.

I used to really, really hate it because you got some operators that like to run tonnage, and you couldn't go home because you had the surge tank full enough to make it through the night, and so those operator would actually run that tonnage faster--out-running you during the day, so you'd be sitting out there for three hours dredging, and not gain anything on the tank

because they're out running you in the mill building. There are a few little tricks you could do which I was taught by some of the operators. What you could do, is you could hit a sand layer --you didn't want to get the sand because there wasn't any value in the sands, there was just the waste, but the slime layers were where the silver was still. What you do is you just go up there and hit some of that sand layer, and when that sand went down and hit their thickener, it would just torque up in a heartbeat, so they'd start slowing the tonnage down to--

Swent: They would torque up in a what?

Birdsey: In a heartbeat; just real fast.

Swent: Oh, okay.

Birdsey: They would start getting torqued because that sand's heavy, so they'd start slowing the tonnage down to keep the torque under control, which allowed you time to start--

Swent: --to get a little rest.

Birdsey: Which, I'm sure, if the company--they would frown on that if they ever saw me do it. But you can't stay there forever. That was one of the tricks you could do. Sometimes they'd get on you, because I'm sure the company knew. There was a couple times where you knew if you tried that you might go a little far and give them too much sand, and then they're fighting--they're not getting any tonnage because they're getting all this sand, and then they would be on you; you have got to quit all this sand. But I hated that job because it was just in the hot sun, and you are out there running this equipment, and nothing is happening. It was very boring.

Helping the Refiner Pull Zadra Cells

Birdsey: So I was glad when the summer was over, and they put me back in the mill building, and I helped the refiner, Charlie Rivera. He was the refiner when I was there, and I helped him pull Zadra cells--that's the round cells they use for electrowinning--wrap steel wool around it, and they set inside this plastic polyethylene tank and put a charge on it; it's like a big battery table. You hook it to the Zadra cells, and they plate the silver up on the steel wool, and then you flux off the steel wool. So, I helped him get in there, and clean up the Zadra cells, and I really enjoyed that. I started getting interested in the

refinery. But unfortunately, it was just a one-man job; they just had me there to help him because he had a bunch of cells to pull one day. So I worked on and off; whenever he needed help, and then I had to go back and be a mill helper or a crusher helper--whatever they wanted. Then they put me on crew permanently as a helper. I worked there like that for, I guess, going on almost three years. Then, when I went to work for Homestake, silver was forty-nine dollars an ounce, and when they laid me off, it was down to four dollars and something.

Silver Price Drops and the Mine Closes Down

Swent: So you could see the handwriting on the wall?

Birdsey: Right. They always said we needed nine dollars an ounce to make a profit to pay for the underground mine and all that. When it was down to four and five--but actually I thought it dropped all the way down to like three, and they didn't lay nobody off. I believe they asked us to take a pay cut, and there was a few little layoffs, but nothing really serious. Then silver started coming back up, so I thought we had made it through the hard time; silver was coming back up. So I was kind of surprised when we got laid off.

Swent: When was that?

Birdsey: That was in 1981; it was August of '81.

Swent: How did you get the word?

Birdsey: By accident, actually. John Penzine, my mill superintendent, who is now dead, from Lead, South Dakota--

Swent: That's a good old Cornish name, there.

Birdsey: He was excellent as the mill superintendent; that guy taught me a lot. Anyway, I called up to talk to Doug Hatton; and Doug Hatton, he never missed a day of work--never late, never missed a day of work. We were going to go up and do some salmon fishing and try to catch some salmon--lake salmon--called Blue Mesa reservoir. So I called him up to ask him what time he wanted to leave, and he was working day shift, and he was getting off, and I was on my four days off, and he was going to take vacation--but anyway, we were going to get together, so I called him up to ask him what time he wanted to go. I called the dog house, the control room--we called it dog house--and the mill superintendent

answered the phone, which was really kind of strange, but in the background I could hear the Galigher tails pumps running. When you hear the tails pumps running, the means the mill is down, because if the mill was running, you couldn't hear those pumps, but when the mill is down, you could hear those pumps. We had been having troubles with our shaft to the ball mill--it kept snapping--so I thought the mill was probably down because we lost the shaft again. So I asked John, I said, "John, is Hatton there?" And he said, "No, he's not." And I thought that was a little strange, because Doug never missed a day, and I said, "Is he sick?" And John's exact words to me were: "Norm, aw hell, when do you come in?" And I said, "I'm supposed to come in on swings." He said, "Don't come in." I said, "Don't come in?" He said, "No, we've closed the mill down." And I said, "You've closed the mill down?" He said, "Yes." I said, "Okay." I was just in shock. Everybody in town--Homestake had been going since 1966 now it's 1981--

Swent: No warning at all?

Birdsey: Not really; not for me anyway. It was like, whoa! This is different. So, I told my wife; she was a little emotional, and I went and called my father, and he was just in shock--the plant has been there twenty years, and it's like somebody saying, "Hey, the Empire State Building is gone now." So, I was sitting around the house, wondering what I was going to do, and the phone rang--it was John, and he said, "I need you to come up here to work." I thought, "Great, maybe I kept my job." But all they wanted me to do was clean my locker out. So I got up there, and that's how we all got laid off: Doug Hatton, and I, and Gary [Lappin] went downtown and went to my house. By this time I had purchased a house; about eight months before this. We went to my house, and proceeded to have a party, and get a little drunk. Then they ended up shutting down and laying everybody with ten years and below off; which was pretty fair.

Swent: Did you get some sort of severance pay?

Birdsey: Yes. What I got for severance at that time was two weeks pay; that was it. Just plain two weeks pay. They gave us letters of recommendation if we wanted. I talked to John--John Penzine at the time--he didn't know if anything was going on. I do have to back up here: during this time frame--this is very important--Joe Young became the mill superintendent in Creede before these lay-offs happened. My wife's mother came down with cancer, so my wife kind of wanted to get back out here to be with her mother. So I knew Joe Young was working on this project.

Asking Joe Young for a Job at McLaughlin

Swent: He had come out here?

Birdsey: He was scheduled to come out here as the mill manager--I guess that's what his title was here on this project. He was leaving Creede to come out here, so I stopped him and I said, "Joe, how about letting me go out there?" He said, "Well, when we build the place, or whatever, then we'll talk. There's not much going on right now." I said, "Okay." So he left, and then in about eight or nine months, the plant closed down. I didn't know what I was going to do. Gary went and got a carpenter job, and I went back to work at Kentucky Belle cutting meat, and I was on unemployment and things were kind of tough.

Swent: Your wife wasn't working?

Birdsey: My wife wasn't working at the time. She was a dental assistant, but in Creede there wasn't any. So I called up my old boss, Ron, who I worked for when I was in high school, and worked out a deal with him that I would work part-time, and he would pay me food; so that would help with the income and stuff. We did that, and he said, "It's just going to be for the summer because when winter comes, Norm--you know how slow it gets around here--I won't be needing you." I said, "Okay."

Swent: This is still in Creede?

Birdsey: Still in Creede. I didn't know what I was going to do. My wife's mother was getting worse and worse; she needed to go out there. So we scraped a bunch of money together--the rest of our savings--I bought her an airplane ticket, and flew her out to California so she could at least see her mother. I was sitting home alone, and I don't know what to do, and I don't have a job, and Ron's telling me--this is December of '81. What do I do? I go down and I join the navy again.

Another Hitch in the Navy

Swent: Good old Uncle Sam.

Birdsey: Good old Uncle Sam. So I went back in the navy--this is a bad time. My wife--she really wasn't too happy about me doing it. I didn't really talk to her about it because she was already out here. Anyway, I joined the navy and we ended up getting

stationed in Virginia, and I got put on an aircraft carrier: the U.S.S. America. I was going to make a career out of the navy; I didn't mind the navy. When I got on the aircraft carrier, I was never home. I think the two years I was in the navy, I was home three months. So I did another two years in the navy on an aircraft carrier, and I called Joe Young when I was in Virginia. I said, "Joe, remember me? My name is Norm, and I worked for you?"

He said, "Yes."

I said, "You told me once that you couldn't do nothing because the mine was just being built; it's two years now, I'm calling and I want to know if you would hire me?"

He said, "Come on out here."

I said, "I have a chance of getting a job in Virginia here; I need to know do I have a job?"

He said, "Come on out."

I said, "But do I have a job?"

He said, "Come on out." He wouldn't give me an answer.

I talked to my wife, and I said, "Listen, he says I got to come out there."

She said, "Do you think you'll get a job?"

I said, "I don't know why he wouldn't hire me. I never did anything that he would be upset about, and I always tried to be a good employee. Let's give it a chance. I have a job here in the shipyards, but I'd rather not work in the shipyards; I'd rather get back into mining. We would be with your mother."

She said, "Okay, let's do it." So we packed up and sent everything out here, and I arrived, and stayed with my friend Gary who works up here, because he had already gone back to work in Creede--they had a rehiring for something, I can't remember what it was. He worked there for awhile, then he transferred out there. So I stayed with him, and I came up, and said, "Joe, I'm here."

Joe said, "Sign this." He had everything ready.

I asked him, "Why didn't you just tell me you were going to hire me?"

He said, "You can't believe how many people say they want a job, and then I reserve it for them, and they never show up. So I had to make sure you were serious about coming out. You moved out here, you're here, fine." So he hired me, and that's how I started out here: Joe Young.

IV THE MCLAUGHLIN MINE SINCE 1984

Joe Young Comes Through After All

Swent: This is in '83?

Birdsey: This was in '84. Actually, I went into the navy in January of '82, and I got out in December of '84. Two years in the navy.

Swent: So this is winter of--

Birdsey: This is winter of '84. I was out here in California December 28 of '84. I started working for McLaughlin January 8 of '85.

Swent: That's a good place for us to take a little break. [tape interruption]

We're starting after just a little break. So, here you are in January '85. You're living in Lower Lake?

Birdsey: I'm living up on Cobb [Mountain].

Swent: Where you still are?

Birdsey: Where I still am. Gary, my friend who works out here--he and his wife had rented a four-bedroom home. That's all they could find when they moved out here. So, as you could imagine, rent was kind of high, and money was kind of tight because prices around here were kind of high, so we decided that we would share the rent on this four-bedroom home. My wife and I had one bedroom, and Gary and his wife had one bedroom, and their two kids had a bedroom. We lived together until we could get set up to buy a house.

Swent: And your mother-in-law was still in Oroville?

Birdsey: She had passed away when I was in the navy. My wife's father and all of her family is in Oroville and the Bay Area.

Swent: That's not too far.

Birdsey: That's not too far. So it's a good place for my wife, and I like Cobb. It reminded me of Creede: pine trees and everything.

Swent: Quite a drive though.

Birdsey: Yes it is; but it's worth it.

Swent: How far is it?

Birdsey: It's seventeen miles to Lower Lake; and seventeen miles up here. So, thirty-four miles one way.

Swent: That's not bad.

Birdsey: It's not bad; people do that a lot. So we were living up there at Cobb, and I hadn't been out to the plant yet.

Swent: Where did you get the job?

Birdsey: I'd been up here, but I hadn't been out in the plant yet.

Swent: You were hired on--

Birdsey: Hired on; and then I had to get my physical and all that stuff.

Swent: What sort of pay did you get then?

Birdsey: I'm trying to think. I think when I started on, I was making ten dollars an hour here. Which I thought was great; this is good, good pay.

Swent: And benefits?

Birdsey: And benefits. I was hourly, and I had my medical and glasses and stuff like that. A couple things Gary told me; he said, "Norm, you can't believe--this place is big. It's really big."

And I go, "How many tons?"

He said, "We run three thousand tons a day."

I said, "Gee, really?" You know, we were talking 350 tons [in Creede], and three thousand--. I said, "Man!"

Gary said, "Yes, you can't believe the size of some of these pipes."

Anyway, even though I had mining experience, and they hired me as an experienced operator, I had no idea. [laughter] I knew a little bit about flotation, and I knew about a little rod mill, a little ball mill, but I had no idea. We took a walk around the plant up here at this end, and the autoclave building wasn't even there yet. The framework was going up, but the autoclaves weren't inside. People were working--they had one thickener; they had water in it, and they were using it for water treatment. The other thickener was built, but none of the pipes were hooked up yet; the precip[itation] thickener wasn't hooked up yet.

Swent: Was it already in operation?

Birdsey: No, this is during construction. We haven't--they're still building stuff here. We waited for some more people to come in, and then they started the training classes.

Swent: Of course, Joe Young knew how much you knew.

Birdsey: Right.

Like Going From a Glider to a 747

Swent: He was aware of what you--

Birdsey: He was aware of everything I had done. That's what they kind of needed: just an idea of basics. It's kind of like somebody--I would use the analogy of somebody flying a glider airplane and then all of a sudden being put in the seat of a 747. It's humongous; it's unbelievable for me. They sent us to class and--

Swent: Where were the classes?

Birdsey: Classes were held down in the core shed in a trailer. This is the first time I met John Turney. The guy impressed me right off the bat. Without sounding corny, he was just like a wondrous pool of information; great personality--I was just drawn to him right off the bat. I didn't really know who he was; he was this guy giving this class. He explained things where I could understand him. So we're in this class and we're starting to talk about P-and-I-D's. What is a P-and-I-D?

Swent: How many people were in the class?

Birdsey: I think there was probably about fifteen or sixteen. We were starting with an operating crew; the start-up crews.

Swent: What is a P-and-I-D?

Birdsey: Piping and instrumentation diagram. You got a picture that tells you where all the pipes are going and coming from. So we would go to class, and we'd go through the P-and-I-D's. We'd take a circuit, and we'd look at it. They hired--the guy's name is Johnny Grider, Performance Associates--is who they hired to teach the class and make all the training. They made training manuals for each of the circuits. They told us what the circuit was for, how it operated, and--

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Birdsey: --so we'd take each area and we'd go over it, and during this time we had people from all different areas, and we had people that worked in copper mills and mines, and we had people that worked in uranium mines, and we had people in mills, and these people were starting to talk about things that I was--from that little mill in Creede--that I never had experience with. So I started meeting all these people--interesting, interesting. I'm learning things from them as they were talking: "Really?" I learned there's actually a whole new world of milling out there. Actually, I thought Creede was state-of-the-art. That was twenty years old. We're doing all this stuff. I remember one thing that really just amazed me, totally amazed me: a rake-lift mechanism. It lifts the rakes in the thickener when the torque gets too high. I was just amazed that they could do that. Back in Creede we had a big wheel that we had to turn to raise the rake, and here it did it by itself. It knew when it had too much torque, and it raised by itself. I was just amazed, and John Turney is the one that got me really interested in this because he started explaining to me what a control loop was and he used two things: rake mechanism secondly; but first he used a simple water tank and a guy using a valve and he says, "This is a control loop."

John Turney, Expert Teacher

Birdsey: He used a guy by the name of Randall Rumery. He says, "I tell Randall Rumery I want this tank kept at fifty percent level." So Randall goes up there and he sees the tank level is dropping; he opens up this water valve, and fills the tank back up until it gets half full, and then he shuts the water valve off, and he'll

watch that tank until the level starts going down, and then he opens up the water valve and he fills the tank up. He says, "Now, that's the control loop. But now, instead of Randall doing that, the instruments are going to do that. We have a sonic level indicator here that's going to watch the tank for us in place of Randall. We're going to have a valve here, and as that tank level drops, it's going to open up this water valve because the sonic level indicator's telling it to, and we're going to fill the tank up. That is a control loop." It hit me, because we're told that these control loops are one thing, and we go, "Oh, my goodness, I'm not an instrument guy, I don't know how to read these things." But John Turney, with that simple explanation broke it for me to run.

Swent: So you weren't afraid of it?

Birdsey: Right. It's like, wow, I understand that. Then the next thing he did was the thickener, because I was really impressed about these thickener rakes raising by themselves. I wanted to know: how did they do that? He says, "Let's look at the control loop." Then he showed me how to read the control loop, and it clicked. John had that way with people. It didn't not only for me click, but it did for the whole class. "Wow, I think I understand this."

Swent: You say you read it. Is it a printout of some kind?

Birdsey: Yes, it's a printout. I'll show you here.

Swent: These I haven't seen.

Birdsey: These are the training books. This right here is the P-and-I-D's. It shows you where the flows are; where they go. I think the control loops are right here.

Swent: There, I see.

Birdsey: What this is telling you right here is--you got a level indicator, a level transmitter, and a level recorder. That's setting a signal down to your OIU; which you're reading all this stuff off an OIU.

Swent: What's OIU?

Birdsey: Operator Interface Unit. That's the control panel monitors. When it's in a square like this, that means it's in an OIU; it's like when you have a television screen. So you got a level alarm high; that's LHA. It's recording the level on a trend. It's got a level indicating controller. So what's that doing is: as the

level goes up, it takes the pump and speeds up--the level is getting too high, we need to bring that level down. So it's going to a speed controller which is running the level controller. Just by him doing the thickener one and the little one, it showed us how these things work.

Swent: When you say you read it, you're reading these--

Birdsey: --diagrams here. If I was--

Swent: Were you actually given one of these?

Birdsey: Yes, I was given one for--right here--that's the circuit I started up.

Swent: CCD.

Birdsey: CCD. Counter Current Decantation and Neutralization.

Swent: Counter Current Decantation and Neutralization.

Birdsey: That's the circuit I started up.

Swent: This huge binder was given to you to learn? No wonder you were overwhelmed. It's two and a half inches thick.

Birdsey: So that's what they had given me to learn; that was my area to start up. When I first stared here, we were going through this course--nobody was assigned an area yet. Nobody was even on a crew yet; we were just all learning the plant.

Swent: There are three volumes there: the CCD and Neutralization; and then the acid wash, which is the same size; and one that's even thicker that's three inches.

Birdsey: The autoclaves, I believe, were two.

Swent: That's utilities and reagents. And then there's autoclaves too.

Birdsey: There were numerous books. Autoclaves were the size there; only there were two volumes.

Swent: That would be six inches.

Birdsey: They had the whole plant: each area done, and the control loops and how things are supposed to run and stuff. So we were all in this room, and they didn't have any crews yet, and they were just starting up. So we'd go through the plant, and we'd go to school during the day, and then we'd study an area, and then we'd go out

and they'd show us the area. I remember--we were talking about grinding, and grinding was pretty much done, or getting close to being done. Everything up here hadn't been done yet, but we were going to run direct--we were going to run oxide material stuff that didn't need to be oxidized; it had already been treated, Mother Nature had already done that for us, and we were just going to run that through CIP; we were going to use neutralization, CIP, and grinding.

So those three areas were pretty much completed; the rest of the plant was still in the process of being built. I say they didn't have crews, and they really didn't have crews, but they had already taken some of the people that were hired before us, and sent them down to grinding to help get started for start-up. So we were walking around, and I was used to this little rod mill and ball mill, and I walked in that mill building, and I looked at that big old SAG [semi-autogenous grinding], and I just was impressed. When I was in Creede, I looked through the E&MJ, the Engineering and Mining Journal, and I'd see these pictures of these sags, but I never really put two and two together; I just thought it was some strange new looking mill they had. I never thought I'd ever be running one. But I went down to grinding and there they were: this big SAG and this big ball mill. You could walk in these things! These were humungous, you know. It just amazed me.

So we went through class, and finally, they came in one day, and said, "All right, we're going to start grinding up." They had to do a twenty-four-hour, or thirty-six-hour run on it, or something for the construction company to turn it over to us. So they came into the class one day, and they picked these people--maybe six or seven of them--and put them out on crews as grinding. I remember one of them was this girl by the name of Terry Moore, and she and I got to know each other from the class --I remember she was just scared. She did not want to go down there amongst that big old mill, and run those pumps. I kept telling her, "Terry, it's not going to be that bad." She became an excellent operator. I think today if she had to think about it, she'd probably laugh. She doesn't work here anymore. One thing that made me laugh: she was worried about breaking her fingernails. I always thought that was funny. I said, "Terry, the least of your worries is your fingernails." But anyway, they took these people down there, and they started the mills up, and we continued to stay in class and go through the process area. They used these people they took out as helpers and laborers down there for the start-up. We continued to go through class, and then all of a sudden, they came in one day and said, "Well, we're going to stop the classes. We need some more help down here grinding, and we're going to put you out on your crews."

Assigned as a Counter-Current Decantation Operator

Birdsey: They gave me my crew assignments: Alan Jones was my assistant foreman; and Dan Prothro was my shift foreman. He's the one that picked me to run CCD. He said, "You're going to be my CCD operator," and he put me up there. I went up to CCD. When I got there, one of the thickeners was for water treatment, and I used to help with the water treatment on it. The other two thickeners weren't running. They had no piping into the precip area yet, and the autoclave building had walls now on one side. There's still people running all over. So we spent most of our time tracing pipes: finding out where pipes were going; where they're coming from; and what the pumps are doing; and where the floor sumps are. They'd built a model--I don't know if you saw the model--

Swent: Yes, I've seen the model, and I was just going to ask if they didn't use that to teach you?

Birdsey: Yes, they did. They took us up there a lot on the model; and then I used it a lot. I'd go up there and follow lines, and take notes, and then go out in the plant and try to find them. Unfortunately, a lot of it still wasn't there yet, they hadn't built it. We got the general idea of how--

Swent: Looking at a little model is a little different.

Birdsey: Right; exactly. Then they took us down to grinding, because with the start-up they were having problems, like most start-ups. Pumps weren't working right--

Start-up Problems

Swent: What were some of the problems at start-up?

Birdsey: Some of the problems that I experienced were: they had trouble keeping the mills running for one thing because of the interlocks. You got that computer system, and it will shut itself down when it sees an alarm. So tuning in the system--there's a lot of nuisance alarms, like you would see a high-temperature on a bearing shut itself down when there wasn't a high temperature. It would be just a false reading that wasn't tuned in right. I found out a couple of pumps were designed too small, and couldn't handle a load. What else were some of the problems? Most of it was instrumentation, and your normal start-

up problems: if things aren't wired in right; wrong cabinets and stuff like that.

But our major problem was the mills when we first started; getting those mills to stay running. They needed to get a thirty-six hour run constantly; grinding so much ore and stuff. They had troubles reaching that. In fact, I don't know if they ever even reached that. I think they finally said, "Okay, fine, we'll let our people get in here and start running it." We had some really good foremen. We had A. B. Gonzalez, who had been in mills all his life; and I think he was probably one of the better SAG mill operators or foremen. He could probably teach me; he was excellent. We had Dan Prothro, who was very strong in grinding, and Dan had done numerous things.

Swent: Had these people been with Homestake before? Do you know?

Birdsey: No. A. B. hadn't been with Homestake; and Dan hadn't been with Homestake. We had Al Bishop, who had not been with Homestake. He had been out on Cotter's, and they had an autoclave out there; a little small one they used for uranium to help oxidize uranium. I'm not sure exactly what it was used for, but that's why they hired him, because he did have a little bit of autoclave experience--because these were something brand new. Then we had Mel Heath, who came from many, many years of mining and milling. Those were the four foremen and A. B. was down there, and he's the one that really kind of helped get the grinding going, because he had a lot of experience in it. And Al Bishop actually had a lot of experience--in fact he was on the early design stage of the SAG mill when they were first trying them out; he worked on that. So Al was very knowledgeable. So we had some very good foremen and we learned a lot from them. I remember one mess. The grates in the SAG mill were too small, so we couldn't get the tonnage through, so we ended up--couldn't get the high tonnage because the SAG mill has grates in it which allows floc to come through, so you got to get it ground up really, really small in order for it to get through--well, it takes a while--you have to grind that up, so you have to slow down your tonnage while it gets ground up. Well, by opening up the grates, you get more through--more tonnage through. So we had troubles with that. So we were trying numerous things. I remember dumping oversize, what we call critical--the stuff that comes out of the SAG mill, and it's too big to go through the screen--the cyclone stops and it goes back into the SAG in the return loop--we dumped that on the ground, so we weren't putting that stuff back in the SAG, we were getting fresh tonnage and putting it with these big piles of rock out there in the yard, and--rains--the yards were muddy, and they were slop--

Swent: Wouldn't this happen in any case? I'm wondering why that would be a problem? I think that this would be kind of a standard situation.

Birdsey: It is a standard thing; it's just working through. I'm not saying it was a serious problem, but you couldn't get tonnage; you needed to get tonnage, and you couldn't get it, and that was why; because the grates might have been too small so in order to try and get the tonnage through and keep the tonnage up, other things were happening like piles of recycle were all over the place, and we're trying to get that ran through.

Swent: I would think anybody that was designing a mill would have known that though.

Birdsey: I guess it's very, very hard to--I see stuff like that happen a lot of times. It's just part of start-up; they ended up increasing the grate sizes, and that took a while to get it up to snuff. Another problem we had was ball handling. We put massive amounts of balls in the ball mill, and they come in fifty-five-gallon barrels, and you have to cut the tops off. Reach these barrels, and take a crane, and pick these barrels up--and I'm talking, you got to load like three or four tons a night, with these balls in these mills. You might be moving six or seven barrels a night, and cutting the tops off; we had one of the mill operators get hurt doing this. She started to cut the top of the barrel off, and something happened--she turned the acetylene on--that's what it was--and went to turn the oxygen on, and didn't have a wrench, so she set down the acetylene and didn't turn it off so it was running the whole time she went to get the oxygen, and it filled the barrel with acetylene. So she finally got the oxygen on, and she struck the torch, it set off the acetylene in the barrel, and blew the top of the barrel off, and broke her thumb. What they ended up doing is saying: "Well, if you're not qualified on the cutting torch, which they should have been, then maintenance had to do it." So she needed the balls, but she couldn't cut the top off, so she had to get maintenance down to cut the top off; so it was getting to be a real pain. That was one of the problems you had.

Another problem was the Gehos.

Swent: The what?

Birdsey: The Geho pumps; the slurry pumps. They're a very good pump, I believe, but they're very hard and complicated to understand. You've got pumps running pumps on these things. They were a new pump, and people didn't understand them, and getting those

started and getting the pump line up and running; we sanded it up a couple times. But basically, it was a pretty smooth start-up.

The Crusher: "That Baby Was a Nightmare"

Birdsey: The biggest problem we had was the crusher. That baby was a nightmare, and it remained a nightmare until we quit using it, and got the gyro in. The crusher was underground. There was three stories; the crusher was on three stories. The first story, the rock would come in, and slid down a chute into the jaw. The jaw then dropped down onto the transfer belt, which then dropped down another chute onto the conveyor belt that went up the tunnel, and out to the radial stacker. The drops were so big--so far--the rock fell so far that it just tore--major damage when they'd come slamming down into the jaw, or when it would come off the jaw and down. Spillage everywhere.

Swent: The pit was already so deep?

Birdsey: No, this is for the environmental permitting; the crusher could not be above ground. It had to be down in--

Swent: Oh, this is not in the mine?

Birdsey: No. This is here. This is done in grinding.

Swent: But it had to be under--

Birdsey: It had to be underground for environmental reasons. So anything you had to work on had to be craned down. Spillage, which was massive, had to be mucked up and hauled out of that place. I'm talking it's deep. So, it was just a mess. Belts wouldn't track right. It was just a real pain. That was one of the problems we had: was the crusher. When we first started up--I remember, Dan came and got me up here, and we still hadn't started this side up yet, and I had been tracing lines, and he says, "Come on, everybody that is up here go to grinding." They're taking wet, sloppy mud from the mine and tried to dump it in the crusher, and it was so wet it just poured through everything, and three triple-seven's worth of that stuff is three or four hundred tons of mud and slop.

Swent: The triple-seven is a truck?

Birdsey: A haul truck, right. They'd brought the triple-seven from the mine--it was just full of watery slop. It was so watery that

when it went down, it ran through all the cracks, and the whole bottom of the crusher was full of this mud. We spent days shoveling. The day we shut down--the day we took the crusher off the line--it was the same way. You'd have mounds of dirt down there because of spillage everywhere. It was just a pain. Like I said, it's like four stories all the way down to the bottom; so you had to get that stuff out of there somehow. I was happy to see that one go.

Swent: How did you get around it though? Didn't the gyro have to be underground?

Birdsey: No, the gyro did not have to be underground. I don't know whether they changed permitting or whatever; so the gyro now is above ground. We still have lots of spillage, but it's a little bit easier to take care of.

Swent: Much easier I would guess.

Birdsey: So that was one of the problems--was the crusher. Then grinding was basically pretty easy after that. It was just getting familiar with the beast: learning the equipment; learning how to start everything up and shut it down. Actually, it all came on line pretty good. I was taken back out of there after they started running, because we were getting ready to start up here. That's when the fun begins for me. I wasn't familiar with the autoclaves.

The Autoclaves: When the Fun Begins

Swent: Nobody was I guess.

Birdsey: Nobody was, no. I didn't even study it; I didn't even look at the autoclave P&ID's because there was a lot to it; and hearing people talk and stuff, I was kind of leery of them, and I had to learn my own circuit anyway--the CCD's. Anyway, we started up, and I was probably one of the worst CCD operators anybody ever saw I would think. [laughter] I had some troubles. We all did, but I was trying to over-operate.

Swent: And you hadn't had this at Creede?

Birdsey: No, I hadn't had this at all. I knew where my flows were, I knew what was supposed to be going on, but the pumps were undersized; the pumps couldn't handle the flow. The other problem was with the autoclaves--they were trying to get the autoclaves on line,

and they would have one autoclave up, and then they'd have it down. Then they'd have another autoclave up, and they'd have it down. Then they would have three autoclaves up, and then two would down. Then they'd have three autoclaves up, and all three would do down. And they'd have all three autoclaves up--so, you're sitting here running the thickener,and you're getting all this flow, and then getting no flow. Then you're getting a whole bunch of flow, and you're getting no flow. Then you're getting a little bit of flow, and then a whole bunch of flow. So you're trying to run these thickeners, and pretty soon after they got the autoclaves kind of steadied out, they started pumping all this tonnage to you where your underflow pumps couldn't handle it. You'd have your underflow pumps maxed out--

Swent: Your thickeners came after the autoclave?

Birdsey: Right. So I'm sitting there trying to keep these thickeners under control, and I can't suck them down because the pumps were too small, and they were getting too thick, and it won't pump them. In the meantime, CIP was used to the oxide ore--

Swent: That's later?

Birdsey: That's later. That's where I'm sending my slurry; I'm receiving the slurry, and then I'm sending it over to CIP. We started using this acidic slurry out of the autoclaves, and you smack it with that lime, and it just gets as thick as paste. Then we're trying to pump that over to CIP; the tanks are running over. So, I'm sitting there calling the CIP operator, and the operator is calling me saying, "It's got to slow down. My tanks are going over; you got to slow down."

I'm calling the autoclave operator, and he says, "I ain't slowing down. I just got them on line, I can't slow down."

So what ended up happening is we shut the leach feed pump off; keep everything running, and we'd let the floor fill up. So for four months, I never saw the CCD floor; it was hip-deep in mud. You could sit there and clean it up, but the next day it was back because of all the trouble.

Swent: It was in a--

Birdsey: --contained area. It was just full; and the contained area goes down. It would be waist-deep with this stuff. Then pretty soon things would line out; you'd start running, and get time to hose up--get everything get cleaned up off the floor, and then they'd get the third autoclave on line, and there's too much slurry, and it started getting thick, and the CIP started going over. We

used to run our CIP tanks in series: it would go one, two, three, four, five, six, seven, eight, nine, ten, back and forth. But we could only get about twelve hundred gallons a minute. The tanks were constantly running over their baskets, which--you're losing gold out the tails. Things got pretty serious, so somebody up above regrouped.

What they ended up doing is making two parallel circuits; they took the tanks which was one to two to three to four; they made an A and B side, and then you ran down straight. You had: A, one, two, three, four, five; B, one, two, three, four, five. And you just run them down in parallel circuit. Now, instead of getting twelve hundred gallons a minute through each tank--because you're running a series--you could get twelve hundred gallons a minute down each side. So if you were running fifteen hundred gallons a minute, let's say, or sixteen hundred gallons a minute, you're actually getting eight hundred gallons a minute. Each side, so the tanks could hold them.

Swent: Which you could handle.

Birdsey: Whoever came up with that idea--I'd give them a hug. I think it might have been John Turney. I tell you what: that just lined things right out. That helped us because now we could pump over there, and keep tonnage up, and we didn't have to worry about the tanks. So now we could get rid of the slurry, and in the meantime, they had made the pipelines bigger from the underflow pumps, and they put bigger motors on the underflow pumps before we could get slurry out of the thickeners. Then the CCD started coming around; it was a lot easier to operate. And by this time, the operators had learned what buttons to push and stuff--things started lining up.

One thing I'll never, ever understand: engineers. They always told me the shortest place between two points is a straight line. Engineers--I don't know--they love them nineties --because I tell you, those pipelines had nineties everywhere. And all those nineties just cause all kinds of friction and the pipe could bend and scale up, so they ran new lines--straight lines--and things lined out, and actually CCD became a pleasure to operate; the precip and everything just fell right into place. So I was just getting the hang of it. Well, the refinery started up, and I'd had a little bit of refinery experience in Creede and they needed another person there, so I put a bid in to get into the refinery. And I had probably worked as CCD operator now eight or nine months. I had probably been there about a year and a half total, and I worked as a CCD operator about eight or nine months. I put my bid in to work in the refinery, so they accepted my bid, and I transferred off--

A Better Job in the Refinery

Swent: Is that a better job?

Birdsey: Much better job. Straight days, weekends off.

Swent: Better pay?

Birdsey: Pay was about the same.

Swent: But better hours?

Birdsey: Better hours, and you went from hourly to salary non-exempt, so you've got a little bit better benefits and stuff; which was a good move for me. I liked it. It was very, very interesting. I was excited. When I worked for Charlie Rivera, I used to watch him pour the molten silver out, and I'd think, "Boy, I wish I could do that. I bet that would be hard. I don't think I'll ever get to do that." Now, all of a sudden, I'm going to get to pour gold. So, I went into the refinery and met all the guys in there. Dave Barr, the refinery foreman--

Swent: Who?

Birdsey: David Barr. He was an excellent individual. I was very intimidated at first because of the security, because they had high security in there. So they took me upstairs, and I went to work on the electrowinning cells. That's where they plate the gold off the strip solution. They showed me how to pull these baskets and I was just amazed; you'd pull out these baskets and that wire would just be a nice yellow color. You'd pick the basket up and it was heavy; the gold was heavy, heavy, and you're just going, "Man!" It just amazed me. And all this sludge was gold value. They'd tell me, "Be very, very careful. Don't be throwing the stuff around, it's all got gold value. Remember everything up there has gold value. You take your gloves down and you wash them off before you taken them downstairs and put them in the washing machine, and make sure you hose off your aprons, and keep all this stuff because it's all got gold value."

So it was very meticulous; it always amazed me. And then I went to watch them do a pour in that big old furnace. I watched them pour gold, and then Dave Barr said, "Well, are you ready to pour?"

And I said, "I've only been here a week, Dave."

He says, "Starting Monday, you're going to start learning to charge the furnace and we'll be right behind you, and we're going to start showing you how to do this." Dave started me off mixing the flux that you use in the furnace; I already knew how to do that.

So I got ready and started the furnace up, and I started loading it. They showed me how to stir, and Dave says, "You're not pouring; stand back and watch them pour." He took me through step by step.

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Birdsey: So he let me stir and then they poured.

Swent: There's a real physical hazard here, isn't there?

Birdsey: Oh yes, there is. There's a big hazard here. But they let me stir it; put on the fire suit, reach in there and stir it so I could see how thick it was. Pouring gold--I thought it was going to be very, very technical, and basically it was nothing more than cooking soup.

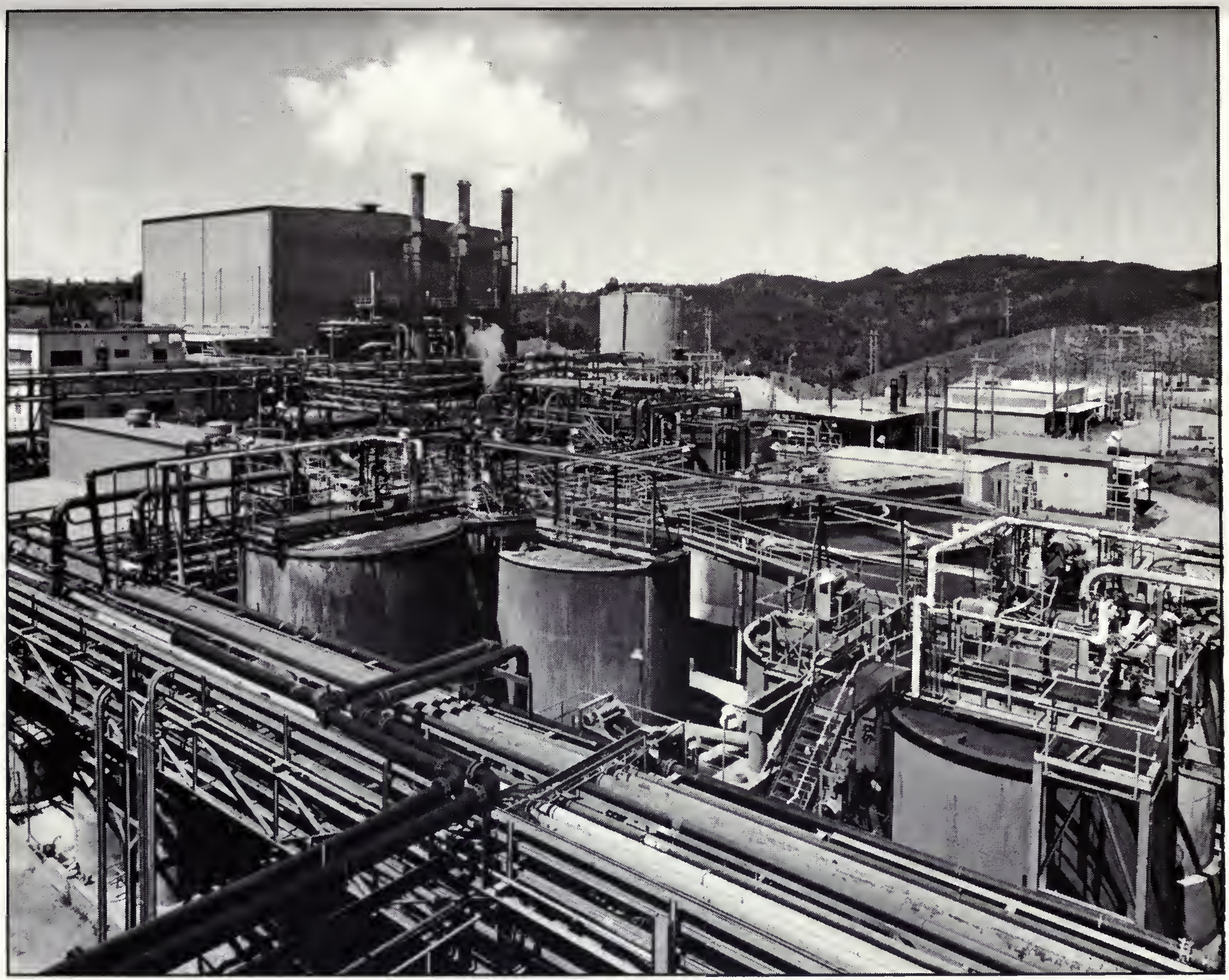
Swent: Extra hot.

Birdsey: Extra hot, but you got to feel it, and you feel how thick it is, and you could tell by looking at when it's ready to pour. But I hadn't got to that point. The next day, we had another pour, and they let me run the controls. I poured three bars, and didn't spill any. I was pretty happy that I poured three bars; it wasn't that hard, I thought, "This is pretty neat." So then I started getting interested in exactly what was happening: why--pouring is good, but what's going on, and why did you use all these different chemicals? The chemicals we used were niter for oxidation--to oxide the impurities in the steel wool. We used borax, which thins it out, and makes it thin and makes it more fluid. We used a sand, which combined and helped with the collecting of the purities, and helped separate it. We mixed that up, and I can't remember what--I think it was like fifteen pounds of niter to twenty pounds of sand, to eight pounds of borax. We had the cement mixer, and we mixed it up, and poured it in this big tub, and we'd flux it throughout the pour.

So I wanted to know what the chemicals did, and I started learning about how to control the furnace and stuff. I started getting pretty good.

Swent: What fueled the furnace?

Norman Birdsey holding the first McLaughlin Mine gold bar, 1985.



McLaughlin Mine processing plant, ca. 1990. Autoclave building with three steam vents, left background; oxygen plant, center back.

Birdsey: It was an electricity field. I'm trying to think--I can't remember the name of it right now. It's not convection, but it worked by electrical field: [induction?] furnace was what it's called. It worked just by sending this electrical field through the molten steel, which got it hot. If you put your hand in there--if you had a ring on, the ring would heat up just like that and burn you. So that's what it ran on: electricity. We'd get it up to two thousand degrees, more than that. You learned to look at it, and tell by the color, and how white it's getting, and how much gold you have, because you could see the gold and slag floating on top. Then we poured into steel molds, which we coated with diesel fuel--

Swent: Just like buttering a muffin pan.

Birdsey: Exactly, exactly. Coat it with diesel fuel, and you'd pour into it. There was a hazard there: Gary--who has a beard like I have --he'd pour these things, then pour diesel fuel, and the diesel fuel would most usually catch on fire and burn off, and you'd also soot them. You'd put them in with these, and you'd also soot them up, so the soot helps keep them sticking. You'd soot them up, and then you'd diesel fuel them. When you poured the molten gold in, it would catch on fire right away. One time Gary--they poured the bar, and then we set it off to the side, and you'd get a pipe, and you grab the bar with these fire gloves and you flip it over, like you do a bread pan, and when Gary pulled the mold off the gold, the diesel fuel hadn't caught on fire because I guess it didn't have any oxygen, but as soon as that bar got out of the mold, oxygen got in there and it flashed, and he caught his beard on fire. So we all learned something there.

Swent: Was he badly hurt?

Birdsey: No, he wasn't hurt bad at all. He wasn't hurt at all; just kind of shook up. The dangers of that was: you have to watch out for molten stuff coming out around the furnace; you have to wear protection.

Swent: You wear a welder's mask?

Birdsey: Actually, what we use now is what the firemen wear at airports: the big silver suits. That's what they use.

Swent: I see.

Birdsey: So Gary got that flash. The only really bad thing that we had happen--nobody got hurt--was when we poured the slag off--that's the waste product coming off the melt in these big steel cone

molds--they're shaped like a pyramid--and you pour the slag off, and they're on a hinge, so the next day after it sets up, you turn them upside down, and then smacked them and all that slag, which is like obsidian--glass--falls, and then we'd do through it because you get little gold pieces in there--and we would re-melt it, so we got to separate it and go through it, and process it in the refinery so we could get the gold values that's in there, and we go ahead and transfer the slag down to mining and run it back through the mill just to make sure we got all the gold. They had one of these things--they were on wheels--and they're probably about three feet tall--top is about three-foot by three-foot square and it goes down to the cone--that's quite a bit of liquid. We had it full of molten liquid--and they were pulling it off the pouring floor and one of the wheels hit a rock or something and it tipped the whole thing over, with this molten stuff in it. Nobody was hurt, but it filled the whole floor up with this molten stuff, and it was so hot that it actually blew chunks of cement off the floor. We hit it with water hoses and fire extinguishers. Nobody got hurt, but it was something scary; a refinery's on fire, there's so much smoke and stuff. Nobody was hurt, and another lesson learned. After that, we started putting a ramp up, and we made sure the place was swept up good.

Other than that, everything went really smooth in the refinery. It was a very good thing for me to do. I enjoyed it; I learned a lot. After about three years, though, I started to get tired of the refinery because--I hate to say I quit learning --but it was like once you know how to pour it was kind of getting old. So I went and talked to Phil Walker who was the mill superintendent at the time, and I told him that I was getting bored in the refinery, and I was thinking about going to back to operations as an operator again. So we had a little talk and about a month later, he called me into Dave Barr's office in the refinery and says that he wants to talk to me. So I go in, and he says, "Norm, you want out of here?"

And I said, "Yes."

He says, "Well, I'm going to make you an assistant foreman on Mike Shaw's crew."

I said, "Excuse me?" "On C crew, I'm going to make you the assistant foreman. Do you want the job?" I had already raised a kind of stink about wanting to get out of there and stuff, so I kind of felt obligated to take it. So I told him sure, I'd take it.

Assistant Foreman on the C Crew; A Big Promotion

Swent: What does C crew mean?

Birdsey: We got four crews: A, B, C, and D. He put me on C crew and Mike Shaw was the foreman. I think one of the other foremen quit or something, so they moved Mike's assistant up, or something.

Swent: There was an opening.

Birdsey: There was an opening. So they moved me up to Mike Shaw's assistant, and I was scared. I knew the grinding; I operated CCD a little bit; I knew a little bit about CIP. I didn't know a thing about the autoclaves though. I didn't know anything about it. I didn't know anything about the O_2 plant--the liquid oxygen plant. I was just saying, "Well, this is amazing, but I'll give it a try." So I came out, and Mike introduced himself, and we started on the graveyard shift. That's what I had to make: I was on straight days, but now I had to go to graves. Shift work again.

Swent: Bottom of the heap again.

Birdsey: So I went out and started working with Mike. Mike had a very, very interesting way of training people: he liked to kick you in the fire and stand back and see what you're made of.

Swent: See what you were what?

Birdsey: See what you were made of. See what's going to happen. That's the way Mike trained. He was there to coach you along and stuff. So I'd been here about a week and a half. I didn't know where the autoclave building was, yet alone what was inside it. I was the assistant foreman, and I'm kind of nervous. Anyway, the autoclave operator called in sick, and Mike says, "Go up and run the claves."

I said, "Mike, I've never ran it."

He said, "I don't care, get them running." So he made me go up there, and I had to run the autoclaves. He had another guy up there who was also an autoclave operator, and he told Tom [Fisher], "You be Norm's helper tonight."

I was a nervous wreck; I had no idea what these 'claves were. So I'm sitting down; I'm trying to get an idea of how they should run, and Tom's there helping me. I told Tom, "Listen, I don't know anything about these. You go out and you get your

samples, and you get your rear right back in here, you understand me?" That guy would go out and stay forever. I'm sitting there the whole time sweating blood. I didn't know it, but Mike Shaw was down at one of the other control rooms watching on the OIU making sure that I didn't do anything wrong, but I didn't know that.

Swent: What's OIU? I know you told me once, but I've forgotten.

Birdsey: Operator Interface Unit.

Swent: Okay, all right.

Birdsey: That's the monitors, and they're all inter-tied in the plant. You can operate anything from any control room. He was down at one of the other control room watching me; making sure that I didn't make any mistakes, but I didn't know that.

Swent: But you didn't know that. What exactly is the assistant foreman's responsibility?

Birdsey: They started out with just a foreman, but as you know, we have the grinding plant five miles away from the process plant. The grinding plant was taking so much of the foreman's time that they needed somebody at this end, to run this end also. They started out with control room supervisors when they first started up, and there were four metallurgists, and their job was to stay in the main control room and supervise the operation of the plant in the control room; the control room staff point. They were metallurgists; if they had something going on, they could give you advice or whatever. It got to be so time consuming for the foreman down at grinding that the control supervisors had to come out of the control room and actually be like an assistant foreman up at this end; keeping it in touch with the main foreman down at grinding. Then what happened was: they needed the metallurgists' knowledge in the lab. They were starting to have some metallurgical problems in the plant, so they said, "Let's not use the metallurgist as an assistant. Bring them into the lab; we will pull a couple of senior operators and make them assistants."

So that's how that got started. Some of the control room supervisors and metallurgists ended up staying as foreman because they had to change right away, and the others went to the lab as metallurgists. So I became an assistant. So an assistant ran one end, and the foreman runs the other end. The foreman's in charge of the crew, but you have an assistant that helps. Mike and I used to rotate every month. One month I'd stay up at this end and he'd stay down at grinding, and then the next month we'd

swap; I'd stay down at grinding, and he'd stay up at this end. But the foreman still is in charge of the crew.

Swent: You could give orders?

Birdsey: Yes.

Swent: And reprimand if necessary?

Birdsey: If necessary, with the foreman. And you start working together as a team. Mike Shaw and I became a very, very good team, and I gave him full control. I work for you, Mike, you tell me that you want; and it works very well that way. So I was his assistant for probably four years.

Swent: And you learned how to work the autoclaves?

Birdsey: Yes, I learned how to work the autoclave. I learned how to run them. In that four years' time, we had two accidents.

Accidents with the Autoclaves

Swent: Tell about them.

Birdsey: The first one was: we had a feed line that goes into the autoclave, the slurry line goes into the autoclave. The autoclave runs about 400 degrees in the back end and 259 degrees in the front. So you're feeding this ore in; about 230 degrees in the front. As it goes through the autoclave, it heats up to about 400 degrees. You used gaseous oxygen you're injecting into the 'claves to keep the reaction going. 'Clave pressure is running about 260 to 270 pounds depending on the temperature that you're running. When we shut an autoclave down to work on it for maintenance, or when we got to do what we call the depressuring pressurizing--take all the pressure off--to cool that down so there's no pressure on it, takes anywhere from four to six hours. That's opening up both vents--it's like a pressure cooker. You can open up the pressure cooker and let it depressurize. You open up both ends--the auxiliary and main vent--and shutting everything off takes between four and six hours, usually closer to six hours to take it down. Sometimes you can do it in four depending on the what the slurry level is. So what happened on us, we were sitting there running, we had Charley train, we got three 'claves: A, B, and C. We got Charley train down, because it had a leak on the feed line going to the 'clave. Now the feed line is pressured up to 'clave pressure; it's running about 280

pounds. We had a leak on it that was blowing a little bit of slurry, so we shut that 'clave down and we were depressurizing it so we'd get that leak fixed on that slurry leg.

Swent: Slurry what?

Birdsey: Slurry leg, coming in.

Swent: Okay.

Birdsey: We did not realize, however--the reason the leak was there was because the titanium line was really, really thin--we did not realize that the A 'clave was in the same condition. We just thought that the C 'clave was our only problem. So what happened was, you have your pipe from the autoclave--it got so thin that it just did this--

Swent: Just opened?

Birdsey: Just opened right up. Now you have full 'clave pressure coming off that autoclave. We depressurized that 'clave in nineteen minutes--remember it takes six hours usually. We did it in nineteen minutes. It's very hard to tell somebody, but the noise level was so loud that up in the control room, Mike Shaw was up there, my foreman, he was asking me if I'd shut the O_2 line down yet, but all I could do was feel his lips moving on my ears. He was yelling into my ear, but I couldn't hear him. That's how loud--everything was vibrating--the building was vibrating. It was just ungodly loud. I don't know how to describe it.

I was really, really scared because right before this happened, I drove by the autoclave building, and one of the autoclave operators--Wallace Dickinson--was going into the building by A 'clave--was going up inside. I drove around the autoclave building, and I got down on the bottom road and it blew, and the last thing I knew was that Wallace was inside that building. So I got back up there and I tried to go inside that autoclave building in three different ways. I couldn't do it. I'd get inside, and there was so much heat and steam, and I couldn't get to Wallace. I was scared because I thought maybe that guy died. I can't describe that feeling: you got all this noise going on, I can't find one of my operators, you can't hear, you can't use the radios. It's just loud! There's steam belching out everywhere, the building's rumbling and shaking, and I was just really stressed. I kept trying to tell Mike that I couldn't find Wallace. I can't find Wallace--I don't know where Wallace is. Mike tried to get into the building a bunch of times. Finally I met Mike outside, and the noise is starting to calm a bit because it's losing pressure, and I look over across

the parking lot and there's Wallace standing behind one of the tanks. After I saw Wallace then everything else was--I didn't care what happened. Everything else was fine. I went over and hugged him. We waited for everything to depressurize and called everybody out. Now we had C 'clave down because we had a weak line. A 'clave just blew because it had a weak line. So we went and measured B, and B's was thinner was the rest of them. So we ended up shutting them down, and getting everything fixed. That was one of the worst nights.

Swent: And nobody was hurt?

Birdsey: Nobody was hurt.

Swent: How did Wallace get out?

Birdsey: He said when he heard that thing pop, he doesn't remember how, the next thing he knows he was going over the hill at the CCD. He got out of that building; he was gone. He hadn't made it all the way up the stairs. Nobody got hurt, and it actually took us about three hours to fix the pipe, and we started bringing her back on line. I take it back: they were going to do that, and then what happened was that 'clave lost pressure so fast that it was sitting there just whining. Going [makes descriptive noise]. It was sitting there cooling down, and it was popping and clinking and they thought they may have had some brick damage in it. So they went ahead and went into a mini-p.m. on it. It was fine; there was nothing wrong with it and they patched her up and put her back on.

Swent: Mini-p.m.?

Birdsey: Planned maintenance. A little planned maintenance. They didn't do a full p.m. on it; they just checked bricks and pulled agitators, and checked gaskets and stuff like that. Made sure there wasn't any stress fractures or anything like that.

Swent: The other ones, you just replaced those titanium lines?

Birdsey: --those titanium lines, and back on line. We had two 'claves up and running probably within five or six hours. It started to heat back up--they weren't running because it takes four or five hours to get it back up to pressure too. Within a day, we had two 'claves going.

Swent: That's quite a story.

Birdsey: Then--I was on vacation at this time. We were taking a 'clave down, and--

Swent: Why?

Birdsey: It had a leak in it or something--a leak in one of the lines. Anyway, we were depressurizing it, and we were down to 250 degrees; at 250 degrees on the 'claves, we shut the oxygen off. You've got to keep the oxygen going at 250 degrees and above, because if you don't, the hot slurry gets up in the oxygen lines, and it bakes in there and it could plug the lines. So you got to keep the oxygen going to keep the lines from blowing out so they don't plug up. We were at 250 degrees and the clave was going down, so the problem you have on an autoclave--or one of the problems you have--is all three claves looked identical. This had the same valves, the same pipe arrangement as this one, as this one. On the outside out here, where your oxygen lines are, they're identical with exception of the oxygen lines are moved down one. So there's nothing here in front of C 'clave for oxygen and the C 'clave's oxygen valve that feeds that 'clave, sits in front of B. B sits in front of A, and A sits clear out here. We were pressurizing the A 'clave; it came time to shut the oxygen off.

Proper procedure for shutting the oxygen off is: you go ahead and go to minus five on your oxygen control valve; you then go over to the three main blocks on the header, and you close each individual block, and you lock it out. You then go back to your oxygen control valve, and you crack it, and you bleed all the pressure in that line off in the 'clave. Then you're done.

What happened was: the operator went out to do that. Like I said, B 'claves' O_2 lines are sitting in front of A. So he went and he closed off the main blocks on the B 'clave.

Swent: Instead of A.

Birdsey: Instead of A. The operator didn't notice that the B 'clave O_2 valves were closed. He should have saw that on his OIU--he should have seen the pressure drop off. When you're running three 'claves, it's kind of hard--you're only taking one down anyway. Where the operator made his mistake was: when it came time to bleed the line, when Tom said, "Okay, go ahead and bleed the line, I've got the valves closed," instead of cracking it, he went 105; just opened the valve. Tom had never closed those blocks, so he took three hundred pounds of O_2 and just slammed it into that 'clave. He started a titanium fire on one of the titanium lines that goes in, and it burned out through the side of the 'clave and caught on fire, and melted right out to the top. Big old fire ball! We had a man in the building welding at the time, and stuff was flying around him. It broke right

through the side of the 'clave. Again, we're fortunate nobody was hurt.

Swent: It's amazing. You weren't there actually to see this?

Birdsey: No, I was on vacation. I was fishing actually in the mountains.

Swent: Good place to be.

Birdsey: I didn't get to see this one, and this one they said wasn't loud, but there was blue flames everywhere. Again, we learned a lesson here.

Swent: Terribly lucky.

Birdsey: And these 'claves are kind of scary. They're to be respected and it was something new. The newer 'claves, like they have in Barrick and Lone Tree--they seem to be--you figure they got ten years, they were brand new, and they made all kinds of innovations, and they're easier to operate and run.

Swent: Those are smaller, I think, also--aren't these unusually large?

Birdsey: No, actually, these hold about thirty thousand gallons--I can't remember the cubic feet, but the ones in Barrick are bigger. They're making them bigger. Lone Tree's may be a little smaller; but Barrick's--they're getting bigger and holding more pressure. Our max pressure is 325 pounds; three hundred and we're panicking. I shouldn't say, panicking, but three hundred--hey, that's not good. Two ninety, we're worried, three hundred is not good, and 325, it's too late. The other 'claves--like in Barrick--they run 450 pounds on it. They're up there. So, that's the kind of the things I got when I was assistant foreman working on the autoclaves, and I got to learn to know them. Then Mike Shaw quit and went to work for Asarco in Arizona. They made Mel Heath, who had one time been a foreman, and then he had a heart attack--they took him off as foreman and put him as labor foreman--they took Mel Heath and put him back as foreman on C crew as my foreman. And I worked with Mel for about a year and a half; still being an assistant. Dan Prothro--who was general foreman down at grinding--he left and they took one of the foremen, and put him down there as general foreman. Rick Jensen --they moved him up to general foreman. So that left an opening in the operations department, and they put me as foreman over in B crew. And I was foreman for two years.

Foreman Over B Crew

Swent: Is this an easier jump to make?

Birdsey: No. I thought it was going to be easier. First of all, there was a little bit of hard feeling to start off with. If I ever had to apologize for any of my actions in life, I'd like to apologize for the way I acted when they made us switch crews. What it was: everybody had been on--I'd been with C crew now for five years. I had good friends--Don Horn--he was another foreman who had been on his crew eight or nine years. So we all had our crews we had been on for a very long time. When Rick went to general foreman, what they did was, they took the foremen and made them switch crews, and that upset me.

Swent: So you were taken from C crew to--

Birdsey: --to B crew. I was C crew assistant to B crew foreman, and I acted pretty much like a little child. It upset me because I knew these people, I knew how they acted, and there was a lot of time I was unsure. It was like I was a foreman on a new crew--I don't know the people.

Swent: Do you have any idea why they did this?

Birdsey: No, I really don't.

Swent: I wonder if there was some theory that it's better?

Birdsey: I think that it was supposed to stop favoritism if there's favoritism--and there probably is. I have to be honest--there's people you like more than other people on the crew, and if you're on there long enough, you get too familiar, and you start giving people breaks, and some people not, so you change crews. I just had a hard time dealing with it. I stayed up here four days on my days off trying to talk them out of doing this, and it finally got down to the point where it was: do it or leave. It actually turned out very, very good. I took over and became foreman, and once I settled into the job, it was a whole new aspect. As assistant--you're doing the same exact job you were but instead--as assistant, you had a security blanket: "Go talk to the foreman." If you don't want to make a decision, talk to the foreman, he can make it. Now, there's no one to talk to; you're out here all by yourself, and you run into different situations that you don't know what to do about. You've got to make calls.

The biggest calls that bothered me is the safety calls. When you're on the autoclaves and you got something going on,

they call you up and say, "Norm, do you think we should take it down?" You're looking at this leak, and you're going, "I don't think it's bad enough to go down, but do I want to take a chance of hurting somebody?" So you got to make these calls: "No, don't take it down, we'll run it." You still got to get production; you still got to keep the tonnage coming through. You got to pay the bills here. If you take one autoclave down, that's one third of your production there. I didn't like making those calls; but as time went, they became easier. A lot of the other stuff--the stuff you don't see--like an accident on Morgan Valley Road. You're the foreman, they call you down there. You got to have them call the ambulance, you go down, and you try to give your assistance. Things like that. All kinds of stuff: running people off the Davis Creek. Nobody's supposed to be down there, and you have to chase people off, and they get violent--not violent, but rude. They don't understand why, and you say it's just the law: "You can't be fishing here. Get out." You got to argue with them.

Swent: You had control on that territory?

Birdsey: Yes. We got pumps down there we have to check.

Swent: Every day?

Birdsey: Every day. We got to drive the pipeline everyday; make sure there's no spill environmentally. We got the seepage ponds we got to check every day. All this is for--

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Birdsey: --usually, you get your people off the labor crew; people that work on the labor crew. When you need somebody new, the next guy on the labor crew will come unto your crew. Firing, I don't have the direct--I cannot say, "Get out of here; hit the road." I cannot do that. It's got to go to a hearing, which is fair. It's up to me to keep the documentation. It's up to me to make sure that they know they're doing wrong, and to have it set up--if I want to get rid of somebody, I'd better have documentation, and then it goes to the personnel manager, and it's kind of out of my hands. I recommend I want him fired. I can make the recommendation. If they fire him, it's up to them. It makes it fair; that way I'm out of the picture. If I had a personal problem with the guy I'm not going to--

Special Training for Foreman; How to Treat People

Swent: Were you given any extra training when you became foreman?

Birdsey: Yes, they gave us lots of training. We went to all kinds of classes, seminars--Homestake's very good in that way. I think Homestake picks their people, uses their people most of the time, and sets their people up most of the time to do their job.

Swent: What sorts of training were you given?

Birdsey: Okay, we went to--the personnel manager had little seminars on how to deal with people. Basically, things that I like to say you learn in kindergarten: treat people like you want to be treated--

Swent: Be reminded.

Birdsey: Exactly. How to deal with employees that aren't doing their job --what's the best way to do that. How to sit down and talk to people. One of the best classes they ever sent was called Dominic Portolise. The guy's name was Dominic Portolise. I saw a book here somewhere when I was sitting here. It's a Dominic Portolise class; he's a gentleman that they let us talk to about how to treat people, and teach you. What he tells you is--he has pilots, not passengers. In other words, everybody's in charge of their own plane. When you're out there flying, and you're doing your job, and you're flying your formation--it's my job to keep everybody in formation, but everybody's in charge of their own plane. If you want to keep the formation, that's fine, but you can't run the plane for them. So you got to make them want to stay with the formation. Yet, if they don't want to, they're still in charge, basically, of their own plane, and they're going to go ahead and go wherever they want to go unless you guide them.

Just things like that: little motivational courses and stuff which I find to be very interesting. Tomorrow, we have a seminar on anger and emotional control. That's where everybody is today. Which is very, very good. We all need anger and emotion control.

Swent: Some days more than others.

Birdsey: Some days more than others, right. So Homestake sets you up to really get that. As foreman, they send me to these things. They sent me up to Winnemucca for an operator's seminar on heap leaching. So Homestake takes care of their people really well. So anyway, I was foreman on B crew for two years. Had an

excellent assistant, Clay Prothro. He and I worked together as a team. Had a pretty good crew.

Swent: Is this the son of Dan?

Birdsey: The son of Dan, yes. Worked very good together as a team; excellent, excellent person. I've always been interested in why things happen the way they do. I do not have a college degree or anything but--

Swent: Doesn't mean you're not educated.

Birdsey: Right. I've always been interested in why things happen. What's going on here? I know what a precip is, but what is precip? I ask a lot of questions. I've always been interested, and I've always been very loyal to Homestake; because I grew up with Homestake: 1966, they moved in. I saw them; my father worked for Homestake, my brother works for Homestake. If my uncle hadn't gotten hurt, he probably would have worked for Homestake. All of my friends' fathers were in Homestake. So, I'm very loyal to Homestake, and I want to see Homestake do good. I like to repay my debts to Homestake. So I maybe try to be a little bit more dedicated.

They came up with, We're now going to be shutting the autoclaves down in a year, or thereabouts, because we're running out of ore. So they were short a metallurgist in the lab. Now, they didn't think it would probably be right, or to their advantage to hire a metallurgist and say, "It's very possible in a year, you're going to be laid off." So what they did was, they put it out for bid: was there any foreman out here who would like to come to the lab, and work as a metallurgist in a metallurgist position, and help with the change over to direct cn (cyanide), and learn a little bit about metallurgy?

A Move Up to Process Specialist in the Metallurgy Lab

Birdsey: So I said, "Hey, I think I'll give that a try." It's straight days; back off shift work.

Swent: Direct cn?

Birdsey: Direct cn. Direct cyanidation. Instead of going through the autoclaves, we're going to be running just like we did when we first started off the oxide ore. So we got the stock piles down there, and we got to move--Ray [Krauss] could probably answer

more about the move--but we've got between eight to ten years of stockpiles that we'll be running through the plant, so they'll be laying about half the people off here. So until then, they needed somebody to help them as a metallurgical trainee. So I volunteered, went for an interview, and I ended up getting that position. So I moved off the shift from shift foreman, into the lab as a metallurgical trainee.

Swent: Is this a better job?

Birdsey: It's a better job; it's a break for me, although I am ready to go back to operations now probably. But for a while, you get a little stressed as a shift foreman, and you get tired of dealing with people problems, and it's like I told my new boss, "You could put me back on shift work, and I probably wouldn't complain. You could put me on a seven-day rotation, and I probably wouldn't complain. However, you put me in charge of some people, and I might whine a little bit, because I get tired of the people." The equipment is fine: it's either working or not working. You can fix it. The people are a whole different animal, and after dealing with them for eight years, I kind of wore out. So, it's nice being able to work in the lab, and I'm learning stuff. And what I'd like to say is--I tell the people I work with, "I'm learning from you guys every day, you guys had to pay for your college, I'm getting it free--I'm learning from you guys every day." I'm learning so much. They take me in, and it's a wonderful job.

Swent: What are you doing?

Birdsey: My title is: process specialist. Basically, they give you areas of responsibility in the lab. My areas of responsibility are: the lime slaker; the CIP area, carbon-in-pulp area; flotation plant; and the carbon handling. And you're basically monitoring the systems, and make sure they're performing right. If they're not performing right, it's kind of your responsibility to find out why. Then your monthly reports have got to be in. You learn how to do costs; find out how much things cost, and why they cost. Is it worth putting this pump in, because how much is it going to cost to put this pump in, and how much are you going to gain out of it? So, we learn all that stuff with this.

Swent: That's something new.

Birdsey: Brand new! It's a way I've never had to think before, which is very, very good, because some day I hope to be a general foreman somewhere. This is part of being a general foreman: it's not only running the plant, but it's figuring, watching the cost, watching the budget, so this is going to help. That's why I did

this. I know it's only going to be a year, and I might even be laid off--I don't even know. But to me, it was worth the move to add this to my career. I think it's a good career decision, because I'm learning things in here that I never expected to learn. I'm in charge of the CIP; I need to watch the carbon concentration, how much carbon is in the tanks, grams per liter; making sure the operators are keeping those; watching the loadings, how much gold is on the carbon in each tank, because you can lose gold if you don't watch it; you've got to do cyanide monitoring--it controls the amount the amount of cyanide residual. I get to run that and monitor--make sure that's staying up and running. I did some work at the lime slaker. I hope it helps; I ran that lime slaker for years, and never really gave it much thought. We used to sit and complain about bad lime coming in, and causing grit problems throughout the plant, and I sat down one day and realized that bad lime doesn't cause grit problems; it's the way we run the slaker.

So I went and studied about the slaker, and learned about how the classifier really works and how the attrition cells work, and I made a few changes down there, which I hope--and it's very hard to measure--but I think it's going to save us some lime consumption.

What I figured out was: you might have bad lime, and it may not slake right, it may not dissolve into the limestone, and it may leave a waste gangue, or waste rock, but the slaker is designed to get rid of that. It shouldn't be going over, and getting up in the tanks and causing screens to plug up and stuff like that. It was the way we were operating, and it just needed something to be looked at; I don't think I came with anything great--

Swent: The fact that you had done the operating--

Birdsey: --probably helped. I started thinking about it, and I said, "That shouldn't be a problem. It was designed to get rid of the grit; let's find out why it's not." We used a few little operating adjustments that I made, and I read up on it, and what I'm trying to get at is: by going into the lab, and looking at it from that aspect, I learned a whole bunch about a lime slaker that I would never learn if I hadn't gone into the lab. It was just a piece of equipment I had to run, and I don't know why it's working or not working, I never really thought about it. But going into the lab changed that perspective, and I learned a lot.

We had a fine carbon collection system--we're utilizing that now--we never really utilized that too much before. But we're utilizing that now; we're collecting fine carbon so we could go

out and find a place to put it; sell it, and get the little bit of value that's on it back so we're not wasting it or throwing it away. That's what I'm also working on. I'm working on hidrostall pumps, a new type of pump--

Swent: What kind?

Birdsey: Hidrostall. [spell] Hidrostall. What it basically is, is a fish pump; it pumps fish. They use it to pump fish in the fish hatcheries, but it's very, very gentle on carbon and it doesn't tear the carbon up when we move it. One thing we worry about is: carbon collects gold. Fine carbon collects gold too, and if it's fine enough to go through the screen, it's collecting gold and going right out the tails. We need to keep that fine carbon from happening. So, right now we're using the eductors, and the eductors are very damaging to carbon. These hidrostall pumps, since they could pump fish, and they're very gentle--put carbon with them and see if it could lower our carbon consumption down and keep from producing these fines which will save us in gold over the years. So I'm working on that. Again, it's only because I went to the lab; I would have never thought or heard of a hidrostall pump, or even considered it, but it opens some new eyes. So I'm working in the lab now as a metallurgist trainee basically.

Temporary General Foreman

Birdsey: This week, like I'm saying, they moved me up to a temporary general foreman for this week because the general foreman is gone, so I'm basically running the crews, and I'm going back to the lab. So they're letting me go up and do a little bit of that. Not much general foreman experience, but they're letting me do that.

Swent: That would be the logical next--

Birdsey: Right.

Swent: --step. You've doing everything now in the plant?

Birdsey: Yes I have. So that's where we're at right now.

Swent: So what happens in 2005, or whatever it is?

Birdsey: Well, I'll tell you what: I hope I stay with Homestake.

Swent: Do you?

Birdsey: I like Homestake a lot; I grew up with them--

Swent: You said your father worked for Homestake but--

Birdsey: My stepfather.

Swent: Your stepfather, okay, because your father did not.

Birdsey: Right. No, my father worked for Emperious.

Swent: Right, but your stepfather did. So, it's several generations.

Birdsey: Yes it is. Actually, one night, what made me decide to join the navy right off the bat--I probably should have said this before--we were out at a party--we got together after graduation--and I'm sitting there, and I'm looking at all these kids that I'd gone to school with, and there's other kids that have already graduated a couple of years ago, and they're out at this party, and I'm looking and I'm saying, "His dad is a miner. His dad was a miner and still here. He's still here." I'm looking at all these kids, and I'm saying, "Man, everybody's still here. Isn't there something else out there? Do I want to stay here and be like one of these people?"

One of my friends--he isn't going to leave, he's never going to leave; he's going to be there the rest of his life. Nothing's going on there right now. But I said, "Do I want that?" I said, "No, I don't. I want to go out and see what else is out here." So that's one reason I joined the navy. It's the one way for me to get out. I'm not too much of a gambler, so I figured it's kind of hard to get fired from the navy, so I'll go out there and give it a try.

Swent: Sounds as if you learned from every experience you've had.

Birdsey: Yes I have.

John Turney's Inspiration

Swent: Wherever you are, you're learning.

Birdsey: I'll tell you why: I met lots of good people in every aspect. I met a lot of people who have been an inspiration to me. One of the ones that I keep saying is John Turney. I don't know what it

was, but he never failed to answer a question for me; he never did. I bet if I called him right now and ask him something, he'd probably answer it for me. He never failed to answer a question for me, and he has a good sense of humor. Thank goodness he has a good sense of humor, because, boy, you talk about a faux pas one day, and I tell you--remember that show the Bob Newhart show. He owned a restaurant, and they had these three crazy guys: [Larry, Darrell, and Darrell?].

Swent: No, I didn't. I was out in places where we didn't have television. [laughter]

Birdsey: Okay. [laughter] Well, Larry, Darrell, and Darrell were just these guys that are just nuts, and I after I'd do a graveyard, you get a little dingy in the morning. I had a pretty good sense of humor, and I thank God John does too. So I was sitting there, and I come into the foreman's office. I'd come up from grinding and go up to the foreman's office--I was still an assistant at the time--and they used to meet up there at the foreman's office, or the mill superintendent's office every Monday morning to find out what happened over the weekend. I don't know if he had something going on, but I pulled into the parking lot, and there were all these cars--trucks--and I couldn't get into the parking lot. Boy there are a lot of people here. So I walk into the door, and I look right into the foreman's office, and Rick Jensen and one of the foremen were sitting there at the desk. I was just in a good mood, and usually, Phil Walker, the mill superintendent, John Turney, the mill manager, and Ron Parker, the general manger of the property, would go into Phil's office and have a meeting. I was in a good mood, and I was just joking around and I see Rick standing there and I said, "Well, it looks like Larry, Darrell, and Darrell are here, huh?" And I walk around the corner, and there's all three of them staring at me. [laughter] So John Turney said something; I was so embarrassed I quit hearing.

Rick said something to them to cover for me, and I was still embarrassed. So I'm sitting there going, "Man, I really messed up." So the phone rings, and it's John Turney and we wants to talk to me. He was asking me something about the plant, so I answered it. I said, "John, are you having a good day?" He says, "By the way, Norm, which one am I?" [laughter] That's just John. The guy just has been an inspiration to me.

Weekend Dredging for Gold

Swent: He is great. What do you do for recreation around your--what you've enjoyed about living on Cobb Mountain.

Birdsey: Actually, what I do for a hobby is--believe it or not--gold detect. I got a gold detector, and I go up in the Sierras, and I have a dredge and gold pan. So, my hobby is basically what I do for a living. There's not much to do like that around here.

Swent: You have a dredge?

Birdsey: I have a little two-inch dredge. Not a great big one; those little backpack two-inch dredge.

Swent: Sniper? Is that what they're called?

Birdsey: Exactly. That's sniping, right. New rules and regulations--the way the environmental is nowadays, they're even getting rid of those. And I could see why: as the gold prices go up, more and more people get out there, and you have people that just don't think. I went to one place up in Sonora--they used to allow gold dredging, and the guys said, "No, I'm not allowing nobody on my property." I started talking to him, and he says, "Let me show you something." He takes me down to this pasture, and there's oak trees knocked down where they undercut the oak tress from dredges. He said, "You see where my pasture land is? That used to be a 150 feet closer. They dredged all that out. I'm not allowing no more dredging." And the federal government is doing the same thing. People are sneaking in with their dredges and starting to dredge during the salmon spawn and all the silt gets in the water, and people are not taking respect for the land. That's another thing about Homestake I like: Homestake respects the environmental thing.

But anyway, that's what I do for a hobby. I do a lot of gold panning and dredging, and I fossil hunt. I like fossils, and going out and finding shells and stuff.

Swent: Do you do that around here?

Birdsey: I do that around here. It's a good area for it. A lot of my time is spent up here. I like my job, and most of my time is spent here. Of course, I've got my computer; I like my computer, and I play on my computer all the time.

Swent: Has your wife enjoyed it here?

Birdsey: Yes, she loves it here. She's working for a dentist. She's an RDA; she's working down at Clearlake for a dentist. She's worked there nine years. She enjoys it; she likes it here. If Homestake lays me off, or whatever happens, so be it, but I hope --you got a few little projects starting up in Nevada, and maybe I could transfer out there, but I'd like to stay with Homestake. My wife isn't too happy about Nevada.

Swent: She'd like to stay here.

Birdsey: But she would. I could see why: her family is all around her.

Swent: Well, that's a ways down the line. But people are beginning to talk about the wind-down now.

Birdsey: Unfortunately, it's not really a surprise. That's what happens with ore bodies: there's only so much gold there.

Swent: But a disappointment I think.

Birdsey: I think it has been a disappointment. I think it was supposed to be a twenty-year project. But things happen.

Swent: It's going to be about twenty years, actually.

Birdsey: Actually, yes. It's not going to be twenty years of autoclave production.

Swent: I suspect that there was a lot of hope that they'd really find more ore.

Birdsey: Yes there was. There was a lot of hope. Not for lack of trying. They've been doing underground exploration. And there still could be; it's very possible. High hopes.

Swent: Do you ever go back to Colorado?

Birdsey: I've been back--about three years ago I was back for my brother's wedding.

Swent: Is anything going on in Creede?

Birdsey: Creede is shut down. It's a tourist town now. They've done lots of good things: they've got a mining museum in there; they've got the old steam motors that pulled the ore cars out. I think they even have my grandfather's pictures, and they have some of my stepfather's stuff in there. For a book, if you really wanted to hear some good stories about mines and underground, you could

talk to my stepfather and Tankersley--well, he's dead now--all those old miners could tell you stories.

Swent: I think you're pretty good.

Birdsey: I was always listening to them when I was a kid. And my grandfather--he's passed on now, but he had some good stories. As I was growing up, he even had Old Key--we called him [Chappy?]--Key Lozot was his name, and he was this old miner, and he lived in this old shack in the town, but he'd been there--since I was a kid, I remember him--and he always had this black dog with him. We'd be out backpacking, and there would be Old Chappy there in the mountains walking the old mines, and talking about the old mines. I don't know if he was a miner, or what he was, but he used to have a lot of stories about it. Some good times.

Swent: A special kind of appeal.

Birdsey: The old mining town. Rolltop desk--I don't why--I always associate a rolltop desk with mines, I don't know why. I remember when I was growing up one time, my grandfather should have never ever showed me this--but when we were small we had lots of old storage sheds from the old mine times, and there was this one shed across the street--doors were hanging off and stuff--we were kids in there playing around. I was drinking a cup of water, and there were these rocks over in the corner, so I tossed this water over in the corner, and it hit these rocks. Smoke started coming up. I was running around with them, and pouring water, and watching all the smoke coming out. It kind of smelled kind of bad. I come walking in the house with this stuff, and my grandpa saw, and said, "What are you doing? Give me that. What are you doing with that?" I said, "What does it do?" He should have never done it--because he had this big cement fish pond with no fish in it. He gets the water hose and fills it full or water, throws the carbide in there, and takes a match and lights it. I'm surprised he didn't burn the town down. We had these little bomb bottles; we'd light it, and it would catch on fire back in these sheds. [laughter] I remember old carbide lamps; those used to be common around the house. Worth some money now.

Swent: I'm sure, yes. Antique collectors.

Birdsey: That's what it was: carbide.

Swent: Well, you've got a lot of great stories yourself.

Birdsey: I hope I have a lot more too.

Swent: I hope so too. I guess we kind of covered the field?

Birdsey: That's pretty much.

Swent: This has been just wonderful. I certainly thank you.

Birdsey: You bet you.

Swent: It's been wonderful.

Transcribed by Estevan Sifuentes
Final Typed by Shannon Page

Regional Oral History Office
The Bancroft Library

University of California
Berkeley, California

Western Mining in the Twentieth Century Series
Knoxville/McLaughlin Project

Brice Bledsoe

DIRECTOR, SOLANO IRRIGATION DISTRICT

Interview conducted by
Eleanor Swent
in 1995

Brice Bledsoe, 1989.

INTERVIEW WITH BRICE BLEDSOE

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INTERVIEW HISTORY--Brice Bledsoe

Brice Bledsoe was director of the Solano Irrigation District [SID] during the years when Homestake was seeking permits to develop the McLaughlin Mine, and he played a critical role in that process. His name was given to me by Ray Krauss of Homestake and also by Twyla Thompson of Yolo County. I telephoned to him and found he was willing to be interviewed, but it was a long time before we actually scheduled the interview because he was enjoying retirement and travel. The invitation letter was sent to him and returned, and the interview was conducted on 31 August 1995 after a postponement because he came home from Switzerland with a respiratory illness.

The SID headquarters on Elmira Road in Vacaville is a new Spanish mission-style building which dominates a hill and projects an image of housing an agency of major authority. We met in an interior conference room at an enormous walnut horseshoe table. The only decorations are an American flag on a standard and a large aerial photo of Monticello Dam, its concrete apron holding back Lake Berryessa. Brice Bledsoe had trained as both a civil engineer and an architect, and he is rightfully proud of the building which he helped to design for the agency he directed. He is tall, slender, well dressed, and looks younger than his years. Skilled at dealing with people, he was well prepared for the interview. He gave me a copy of the history of SID which had been printed for its fortieth anniversary and a map of its locations. He had the latest report from the Colorado firm contracted to oversee the McLaughlin monitoring for more than seventy years, as well as the final legal agreement hammered out between Homestake and SID.

Much is made of the fact that the McLaughlin project lay within three counties: Napa, Lake, and Yolo. The water from the Knoxville District drainage basin goes through Lake Berryessa and into the Solano Irrigation District. This put SID in the picture, although it had no power to grant or deny permits. The Solano Irrigation District is unique in California; it is not a part of either the federal or state water projects, and it lies entirely within one country. It thus has autonomy and local authority. It supplies water to several growing municipalities, to rich agricultural land, and to significant food and beverage processors. The purity of this water is of vital importance to millions of people.

As we conversed before beginning the taping, I realized that this was a story of many tangled jurisdictions. The SID was established after World War II as an independent entity, and the Monticello Dam/Lake Berryessa project has a long history of delicate negotiations involving Napa, Yolo, and Solano Counties, as well as the Bureau of Reclamation and the state Department of Resources. Bledsoe came into the picture when the SID was building the canals and pipelines and the Bureau of Reclamation was still in control. Later SID took over control of irrigation, and still later, when he was director, gained control of the power plant and distribution. This all involved dealing with multiple agencies and units of government. At the time that Homestake's venture came along, the major challenge for SID was gaining control of the power plant.

Bledsoe was, in his own words, "upset" at not being included from the beginning in the McLaughlin planning process. He learned about the proposed mine through a telephone call from a Yolo County supervisor, and not through Homestake. So things got off to a poor start. In the end, however, after many meetings and much work for two sets of lawyers, a satisfactory agreement was reached, and now Bledsoe is satisfied that he guaranteed that the water distributed by SID is of the highest purity.

The tapes of the two-hour interview were transcribed in the Regional Oral History Office, lightly edited, and sent to Bledsoe for review. He made several minor clarifications of diction and returned the transcript promptly. The manuscript was corrected and indexed at our office. The tapes are deposited in The Bancroft Library and are available for study.

The Brice Bledsoe interview is one of more than forty interviews which were conducted by the Regional Oral History Office from 1993-1997 in order to document the development of the McLaughlin gold mine in the Knoxville District of Lake, Napa, and Yolo Counties, California, from 1978-1996, as part of the ongoing oral history series devoted to Western Mining in the Twentieth Century. The Regional Oral History Office was established in 1954 to record the lives of persons who have contributed significantly to the history of California and the West. The office is a division of The Bancroft Library and is under the direction of Willa K. Baum.

Eleanor Swent, Project Director, Research Interviewer/Editor
September 1997

Regional Oral History Office
Room 486 The Bancroft Library

University of California
Berkeley, California 94720

BIOGRAPHICAL INFORMATION

(Please write clearly. Use black ink.)

Your full name Brice Bledsoe, Jr.

Date of birth Sept. 21, 1927 Birthplace Navasota, Texas

Father's full name Brice T. Bledsoe

Occupation Rancher Birthplace Gilmer, Texas

Mother's full name Ila Mae Bledsoe

Occupation Teacher Birthplace Texas

Your spouse Wanda L. Bledsoe

Occupation Housewife (ex-secretary) Birthplace Allen, Oklahoma

Your children Mary Kathleen, Janet Lynn, Brice Jeffrey

Where did you grow up? South Texas

Present community Vacaville, CA (35 years)

Education University of Texas (4 1/2 years Engineering)

Occupation(s) Retired (Executive Director--Solano Irrigation District)

Areas of expertise Water supply and distribution.

Other interests or activities History, architecture, travel

Organizations in which you are active Association of California Water Agencies, National Water Resources Association, Central Valley Project Water Association, Solano Water Advisory Commission, Solano Water Authority

I THE SOLANO PROJECT, BUREAU OF RECLAMATION

[Date of Interview: August 31, 1995]##[1]

Training in Architecture and Civil Engineering

Swent: All right, Brice, we're getting started now. You just returned from a trip to Europe and now we'll have to get back to--

Bledsoe: Back to reality?

[Mr. Bledsoe returned from his trip abroad with a severe cold.]

Swent: To Solano County, back to reality, yes. To begin with, let's have you tell about where you started from and your background and training before you came here to Vacaville. You said you were born in Texas, on September 21, 1927.

Bledsoe: Yes, near the Gulf Coast, near the city of Houston--a small town. And graduated high school there--

Swent: What was the town?

Bledsoe: Navasota--an Indian name. It's about forty miles north of Houston. And then went on to college at the University of Texas; started out in the School of Architecture; decided to change my major after a year and a half to civil engineering. Let's see, that was--left college in late 1950.

Swent: Was water a particular interest of yours for any reason?

Bledsoe: To begin with, structures, primarily. Of course, my interest in architecture and changing that to concrete and reinforced

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[1]## This symbol indicates that a tape or a segment of a tape has begun or ended. A guide to the tapes follows the transcripts.

concrete structures were my major interest--although I had an interest in geology, too. My career after college: I began working with a company as a surveyor in my younger days, and was transferred to California in 1952. So I've been in California now forty-three years.

Swent: But that was in southern California, you said.

Bledsoe: First to Santa Barbara, yes. I thoroughly enjoyed a year in Santa Barbara, and then moved to Vallejo. From there, I met my wife in Vallejo; and we were married there about a year after we met. And all three of our children were born in Vallejo. So I guess after forty-three years of my life, I have to say I'm all Californian, no Texan.

But I came to work, first--in Vallejo, I took a job with a consulting engineering firm, and a lot of the work I did while there for about four years, I believe, included: construction of the Fairfield-Suisun City sewage system and their first sewage treatment plant; also some work in the Isleton-Rio Vista area on sewage treatment. The firm I was working for specialized in that type of engineering. Then the project--when I realized that the Solano project was nearing completion and that--

Swent: And what was the Solano Project?

Bledsoe: The Solano Project--the Bureau of Reclamation project, which includes Monticello Dam, Lake Berryessa, the Putah Diversion Dam on Putah Creek, and about thirty-five miles of Putah South Canal-- that part of the project was constructed by the Bureau of Reclamation; it's still federally owned. But after completion of that project, Solano Irrigation District was about to start construction of some three hundred miles of pipelines and canals to convey the water to the farms--in some cases to the urban areas--within Solano County. And that, of course, piqued my interest, too.

I started work for the consultant who was doing the design work for the district, for its distribution system. Stoddard and Karrer.

Designing the Distribution System for the Solano Irrigation District, 1958-1962

Swent: What was the name?

Bledsoe: Stoddard and Karrer. [spells]

Swent: And they were the consultants to--?

Bledsoe: They were the consultants designing the distribution system for SID. I started work with that in the local office, working with the engineers in charge of construction; did that for four years.

Swent: When was that?

Bledsoe: Let's see. That started in '58. That was my first time on the project in 1958; as I recall that was in October '58. Then in October of '62, as we were wrapping up our construction of the distribution system, the district asked if I would consider staying on permanently on the district engineering staff. And certainly, since I had bought a home here, and my family had settled in Vacaville, that was very appealing. So I did then become a regular employee in October of '62 for the district directly.

II THE SOLANO IRRIGATION DISTRICT, 1948

Pre-World War II Forerunner, the Solano County Water Council

Swent: Let's go back just a little bit, if you don't mind. This might be a good time to reconstruct some of this organization of the district; although some of it you weren't actually personally involved with, but I think it's background that we need. You just showed me a little pamphlet that indicated that there were local people as early as 1940 who were interested in this dam--

Bledsoe: Right. In setting the stage for that concern and that interest, I think too: in the late thirties, the increased well pumping--both in Solano County and the neighboring southern part of Yolo County--were causing a large overdraft in the groundwater, which was a primary source up to that time for most of the water in Solano County. Obviously, that created a concern: the groundwater was being used both for domestic use, urban use, and some irrigation.

Swent: What were they growing here at that time?

Bledsoe: The irrigated crops were primarily orchard and some vineyard, but mostly orchard crops--heavy in prunes, walnuts, peaches, pears, apricots. There was some irrigated pasture. I'm not sure what other crops were being grown at the time. But most of the area was dry-farmed; I mean, the limited groundwater supply did not allow the area's irrigated agriculture that we have today. Possibly 25 percent of what later became the irrigation district, maybe 25 to 30 percent was actually irrigated originally. The other was in dry crops--winter wheat and native pasture.

Swent: And each individual farmer was doing his own well pumping and irrigation?

Bledsoe: Yes. The wells were individually owned. There was no irrigation district prior to 1948.

There had been a number of proposals. In the eastern part of the county, there was a reclamation district that early--probably established maybe as early as 1920: the Reclamation District 2068, which is east of Dixon. But they were using delta water supply.

Swent: This first organization that you showed me a little pamphlet for is called the Solano County Water Council. So that was just an ad hoc--

Bledsoe: It was an ad hoc group although it had been authorized and approved by the county board of supervisors to investigate possible water projects and water supply. It had a number of county leaders, citizens, who worked very hard. [pause; coughs]

Swent: There was the Solano Water Conservation--Flood--

Bledsoe: Flood Control and Water Conservation District. That was created much later.

Swent: That was later.

Bledsoe: Yes, that was much later.

Swent: Okay.

Bledsoe: The Solano County Water Council was studying and investigating various possibilities prior to World War II. The investigations certainly were halted during the war; the council became very active again, however, in '45 at the end of World War II--realizing that they still had a problem, and hopefully that some of the federal funding which had been concentrated on the war effort could be turned to some internal programs and hoping to be able to get some federal financing. So they became very active again in 1945--which I guess, at that point, we're getting very close to the 1948 creation of Solano Irrigation District.

At any rate, when it was determined that possibly the federal government might be willing to construct a project, under reclamation law, it was very necessary that they had some entity to guarantee the repayment of the project cost--because all of the cost had to be repaid to the federal government over time. This led to the formation of SID then in 1948. They held an election of the landowners in the proposed district, and it was approved by a large margin to go ahead with the formation.

That allowed, then, further activity at the federal level to take place. They began to file some proposals and reports with Congress at that time. In fact, I believe the earliest report by the Department of the Interior actually was dated 1948 or 1949.

Solano County Flood Control and Water Conservation District, 1945

Bledsoe: So the formation, which you already mentioned, of the Solano County Flood Control and Water Conservation District, then followed about three years after the 1948 formation of SID, when it was decided that at least five of the cities were going to take an active part in contracting for part of the water supply. And rather than have the irrigation district contract for the sale of that water to the cities, they felt that a regional umbrella organization should be set up to act as the primary contractor then with the federal government; and that led to the formation of Solano County Flood Control and Water Conservation District.

Swent: There must be an acronym or easy nickname for that district. What's it popularly called?

Bledsoe: Well, now that district has been totally reorganized and renamed. It's now the Solano County Water Agency, which locally is referred to as "SCWA." Much easier to handle than the Solano County Flood Control and Water Conservation District, which we never found an acronym for.

Swent: Isn't that funny. So by the time you came on board, then--well, when you were with the consulting group--the SID had already been set up and was--

Bledsoe: Yes, that's right. It was operating and in fact, had secured federal loans for the construction of its own distribution system. That system was built with a federal loan program, and it was totally SID's responsibility, then, for repaying that cost. As opposed to the cost of Monticello and the Putah Diversion Dam, which we also paid for under water rates that were established by contract.

Monticello Dam Is On a Three-County Corner

Swent: I don't want to get mixed up on what we talked about before we taped, but the major dam is the Monticello Dam; and this is, you told me, on the county line.

Bledsoe: Yes. Actually, the location of the dam is what historically was referred to as Devil's Gate on Putah Creek, a very narrow canyon. It happens to be on a three-county corner, with Yolo on the north and east, Solano on the south and east, and Napa to the west. So there's a three-county corner. There has been some argument with Napa over the exact location of that county boundary, with Napa claiming that Monticello Dam is just inside of Napa County. According to the records that we have here and the surveys that the Bureau made, clearly, the Dam is at least a hundred yards inside the Solano County boundary. The exact location of that boundary has never really been determined legally, but only by early description of the ridgetop and where the ridgetop crossed the canyon.

Swent: But there might be a choice of ridges, you said.

Bledsoe: Yes, there are apparently two possibilities. Of course, Napa wants the eastern possibility and we insist the western possibility is the boundary, but--

Swent: And then Putah Creek is the division between Yolo and Solano.

Bledsoe: Putah Creek is the boundary between Yolo and Solano, at least to a point out in the Yolo bypass where, actually, the boundary makes a jog south between the two counties. For the most part, it is the boundary between the two counties, yes.

Swent: So is there a chance that the north toe of the dam would be in Yolo County?

Bledsoe: Yes. In fact, we have documents that support that the north toe of the dam is in Yolo County and the south toe in Solano County --but none of it in Napa County. And I'm sure there are a few people in Napa County who would dispute that.

Designed to Accommodate a Future Power Plant

Swent: At the time that the dam was built, you told me a provision was made for power.

Bledsoe: Yes. The Bureau did include a penstock design which would accommodate future installation of a power plant. But it was not economically feasible in 1954, when we were actually doing the design work. In '54, they made a decision that they would not construct a power [plant] at that time. But later, of course--this was about 1978, '77 I think--we looked at the rising energy cost and informed the Bureau that we felt they should take another look. In fact, we were willing to sponsor a feasibility report to determine--

Swent: We being--

Bledsoe: SID--willing to sponsor a feasibility report to determine the feasibility of going ahead with the power plant construction. At that time, the Bureau agreed with us; they did take a look. We asked our congressman to introduce legislation.

Swent: Who was your congressman?

Bledsoe: Congressman Bob Leggett from Vallejo.

Swent: Let's see. You came in '58 as an engineer.

Bledsoe: Right.

Assistant District Manager, 1967

Swent: And then you rose somehow to manage--

Bledsoe: In about 1967, I believe, I became assistant district manager. The then manager was James Wiggins. I became his assistant and I think it was about '68 as I recall, '67 or--

Swent: Had there been an assistant before or was this a new position?

Bledsoe: No, there had not been; this was a new position.

Swent: You were paid by the county.

Bledsoe: Paid by SID.

SID Funding from Water Sales, Standby Charges, Special Assessment

Swent: But then their funds come from--

Bledsoe: No, no. The SID's funds come from three sources. You're thinking of the funding for the Solano County Water Agency which comes from property tax. The SID funding is from three sources: the sale of water; standby charges, which is an acreage charge; and special assessment, which is similar to property tax but levied on the land value only and not improvements. Our funding is totally different from the county water agency funding.

Swent: I see. So you're a civil service employee?

Bledsoe: The irrigation district is actually a creature of state government, not--well-- It is an agency of the state, not a state agency--an agency of the state. You're probably not familiar with the California Water Code, but the California Water Code provides for a variety of water agencies: irrigation districts, county water districts, and so on--and each of those operates under a special code provision. But it is a creation of the state and as such, my board of directors is elected by all the residents within the district boundary. It is an elected board.

Swent: And they, in turn, hire you?

Bledsoe: Yes. I have a five-member board. They hire the staff. The manager serves at the pleasure of the board directly. The rest of the staff generally is hired by the manager.

Swent: So you were hired by Wiggins who was the manager.

Bledsoe: By Mr. Wiggins, yes.

Swent: Was it sort of implied that you would succeed him?

Bledsoe: Well, I think so. He did hire me originally, yes, as an engineer, and promoted me later to assistant manager. In 1972, Mr. Wiggins died quite suddenly in February of '72, and the board then appointed me as manager. So the manager position is totally at the discretion of the board of directors. I was appointed by the board in '72. I served until this year, 1995, January of this year.

Swent: And you're still continuing as a consultant.

Bledsoe: Yes, I have been continuing on a part-time basis as a consultant to assist on certain projects that I left unfinished.

III MANAGER OF THE SOLANO IRRIGATION DISTRICT, 1967-1995

Reconsidering a Power Plant, 1977

Swent: Well, you have a lot of important things to follow. So in '72 when you took over as manager, the power--

Bledsoe: The power plant had still not been constructed and, as I said, it was 1977 I believe, when we decided to take a look at it again, at the feasibility of it.

Swent: And '73 was the big energy crisis.

Bledsoe: Yes, and energy prices were getting quite high. If you remember the lines at the gas stations to get gasoline and so on.

Swent: Because the population here was booming also.

Bledsoe: Yes--the sharpest increase began to show about 1972, in the early seventies. We were experiencing, like most of California, a rather large increase in population--some of it due to a shift in Bay Area population.

Swent: When the water was used, let's say in the late sixties-early seventies when you were here, were you testing the water? Was the quality of the water any concern?

Bledsoe: Yes. The water quality has always been a concern--even in the pre-project stages, before the Bureau built the project, and certainly after construction. Because beginning in 1962, let's say the early sixties--it could have been as early as 1960--the cities were using some water out of the project, so that automatically means that you're going to have to start monitoring water quality for safety reasons and health reasons. So at least within two years after the project was completed, there's been pretty constant monitoring of the system.

Swent: And how did you do that?

Bledsoe: These were samples that were originally taken at Lake Solano, which is at the Putah Creek Diversion Dam. This is the point where the water enters the Putah South Canal for distribution to the county.

Swent: Between Monticello and Putah, it's just flowing along; you're not using it?

Bledsoe: Flowing in the creek, yes, flowing in the creek about seven miles between Monticello and the Putah Creek Diversion Dam is about seven miles and one of the best trout streams, incidentally, in the state. Trout were not a native fish, but were introduced by [the Department of] Fish and Game. A very popular and very prolific trout stream in that seven miles. I think it should be pointed out, since I mentioned fish, should be pointed out that Putah Creek in almost every year was dry for five or six months out of the year during the summer period, particularly downstream of the Devil's Gate which is now the Monticello Dam location. Any point downstream of that was essentially dry in the summertime. So there has been quite a change: you now have year-round flows in the creek, down at least to Interstate 80.

Swent: And this has been because of capturing the runoff at the rainy time of year?

Bledsoe: Right. Storing. A decision of the California Water Resources Control Board, who issues the water rights permits, required the operator to maintain a year-round release from the dam into lower Putah Creek, primarily for recharge of ground water, and assuming that a continuous flow into the gravelly areas of the creek would provide adequate ground water recharge--and provide for fishery as far downstream as possible. They established a fixed release schedule for each month of the year--in other words, the amount of water to be released in cubic feet per second from the dam into the creek. And this is not a constant amount; it does vary from one month to the next, but the schedule is fixed by the state.

Gravel Mining in Putah Creek

Swent: You mentioned gravelly areas. Has there been gravel mining in Putah Creek?

Bledsoe: Yes, there has been. In fact, the areas immediately downstream of the Putah Creek Diversion Dam were heavily mined by gravel operations. See in the aerial photographs there are large mined areas, gravel pits.

Swent: Do they still?

Bledsoe: No.

Swent: That's another can of worms, is it?

Bledsoe: [chuckle] Well, yes; there's a story behind that, too. I found myself having to voice loud objections to the renewal of one permit back in the early seventies, I believe, because there was evidence that continued mining and degradation of the channel was beginning to undermine foundations at the Putah Creek Diversion Dam, which was a rather serious matter. But obviously, continuing to take gravel out of the bottom of the creek and alongside had created an erosion problem. It was partly responsible for creating this erosion and it was dropping the flow line of the creek. The concern was that this could eventually endanger the structure. I objected, and the County Planning Department did refuse to renew the permits. So there has been no gravel mining.

Swent: So it was the Planning Department that issued the permits?

Bledsoe: Yes. Right. The County Planning Department.

Swent: That was your advice.

Bledsoe: Yes. Another chapter.

The Putah Creek Diversion Canal and Pipelines: A 300-Mile System

Swent: Let's get back. You then did the Putah Diversion Canal, and that was completed when?

Bledsoe: Incidentally, it wasn't just canals. There were three hundred miles of water system, some of it pipeline, and I'd say the majority in canals, yes. Maybe two thirds in canal and one third in pipelines.

Swent: The main canal you said was thirty-five miles long?

Bledsoe: The main canal, though, was built by the Bureau of Reclamation. So our system included--

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Swent: Your system consisted of the lateral canals and pipelines--

Bledsoe: And pipelines for distribution of water within SID.

Swent: Hundreds of miles of it.

Bledsoe: About three hundred miles total.

Swent: And you decided who got this.

Bledsoe: Yes, basically. Designing and constructing all that system was more than a four-year project to get it constructed. Quite a few millions of dollars in special contracts were awarded to construct it.

Swent: And when was that completed?

Bledsoe: The official completion date was 1962, the end of '62. It began in early '58, through '58, '59, '60, '61, '62--so almost five years.

Swent: And then that was sort of a stable picture for a few years.

Bledsoe: Yes, there was some incidental construction going on after that, after I changed jobs from consultant. The consultant had finished up his work in '62; and I transferred then to the district payroll directly. We did some incidental construction after '62, but it was minor compared to what we'd been doing.

Swent: The big leap was in '78 when you went into the power.

Bledsoe: Yes, that was the next big project. Yes. Incidentally, after we received our license finally from the Federal Energy Regulatory Commission, who issues power licenses, then we had to go to a bond election and sold district revenue bonds, which had to be approved by our district voters to fund it. As I recall, that was an $18-million bond issue. The price, of course, would be much higher today to build what we built then. Construction costs keep rising.

Swent: You had mentioned that your Congressman Leggett was the one who introduced this.

Bledsoe: Leggett introduced the legislation, first to authorize federal construction. The Department of Interior had a brand new secretary in 1977. And--

Swent: Who was that? Do you remember? I don't remember.

Bledsoe: I thought I would never forget. It may come to me in a few minutes. I--

Swent: Let's see: Carter was president.

Bledsoe: Carter was president, yes, and newly elected. He had appointed the new Secretary of the Interior--

Swent: Was that Andrus?

Bledsoe: Andrus--yes, yes. Mr. Andrus, yes. And Mr. Andrus had decided that he was going to severely cut the Bureau of Reclamation's budget and activities. You may recall that he issued a "hit list" on federal projects at the time--what was referred to as a "hit list"--and chopped off funding, or at least put everything on hold for a period of time.

They testified at a congressional subcommittee hearing that they would be opposed to constructing the power plant at Monticello. We were then asked by the subcommittee chairman whether or not we were able and would consider constructing a power plant with local funds. I indicated that yes we were able to do that, and we would have an interest in looking into it. Fortunately, in order to hold the license because of possible competition, we had already filed a preliminary application with FERC, just to hold onto the rights to generate power at that location. So even the federal government would have had to have permits in order to generate power at that location. We had filed--

Swent: Excuse me, what is FERC?

Bledsoe: FERC is the Federal Energy Regulatory Commission, and is a part of the Department of Energy. They have full jurisdiction on energy, including natural gas, electric power, and so on within the U.S.

Swent: But you had the permit already processed.

Bledsoe: Well, we had filed for it, yes. It was in preliminary processing; but that filing date is important. Just a sidelight: the filing date gives you first priority or second priority, depending on which order, chronologically speaking.

So we were the first to file and therefore held the first-in-time priority.

Swent: Had you thought of that?

Bledsoe: Yes, because we had a rumor that the Department of Water Resources in California was considering filing; and we beat them by about four weeks.

Swent: Oh, it must have made you feel very good.

Bledsoe: So we did hold the priority in time.

Swent: Where were these hearings held?

Bledsoe: The hearings were held in Washington.

Trying to Transfer the Solano Project to Local Authority

Swent: So you went back to Washington for that.

Bledsoe: Yes. I've been a frequent traveler to Washington, D.C., over the last few years for that purpose and also for our five-year attempt to get legislation which would transfer title of the Solano Project, Monticello, to the local agencies.

Swent: From the Bureau of Reclamation?

Bledsoe: Yes. So it would be a federal title transfer. Eventually, our contract requires us to repay all the cost, and our proposal was that we accelerate that repayment, and pay off now, but acquire title. We actually spent about five years, starting in 1988, up until '93--attempting to get that legislation through and we didn't. We did, in fact, get it past the House of Representatives--very successful there; ran into some obstacles in the Senate, however, because of some of the other issues locally and so on, decided to put it on the shelf for a while. You may have read in the papers that Contra Costa County is negotiating with the Department of the Interior right now to take title to the Contra Costa Canal and their federal facilities, a very similar proposal.

Swent: And the opposition in the Senate?

Bledsoe: The opposition in the Senate came chiefly from the Chairman of the Senate Subcommittee, none other than Senator Bradley from

New Jersey. He is considering running for president these days. Bradley was concerned chiefly--and this is getting off the subject--with the fact that we had agreed with Napa County that under no circumstances would we consider taking title to the lake or the recreation area. And we agreed with that; we had no problem. Senator Bradley felt that if we're going to take any part of the project, we should take all. He did not want the recreation left in federal hands. That left us in an awkward position because of our agreement with Napa County, and the fact that we really had no interest in operating recreation which is totally in Napa County. All the recreation areas are in Napa County.

Swent: No, there's no question about that.

Bledsoe: Right, and we had no interest--unless in fact Napa was willing to work out some sort of joint agreement to operate the recreation, because it's mostly in their interest and certainly in their jurisdiction. But we had agreed already that we would not take title to that part of the project, only the dam and everything downstream; the lake and the recreation area would remain with the federal government. So Senator Bradley put me in a rather awkward position as I was testifying and at one point said, "If we insist that you take the recreation area, is that a deal-breaker or not? Yes or no. [chuckle] What do you say?"

Swent: What did you say?

Bledsoe: I said, "Senator, that creates a serious problem. I'm not going to say it's absolutely a deal-breaker, but there are many things that would have to be considered, and I would have to review this with the local agencies." And left it at that. I refused to answer "Yes" or "No."

Swent: What would be the advantages in getting the dam locally?

Bledsoe: Well, there are two things. We find that not only are we repaying the original construction cost, but each year we pay administrative cost. Because the Bureau takes all of its expenses and divides it up among the many water projects, they prorate it out, we get stuck with certain expenses in their Washington office, their Denver office, their Sacramento office. It's pretty hard to track sometimes. They admit it is arbitrarily allocated, and it amounts to over a quarter of a million dollars for us in their administrative costs--which is not repaying the project. It's paying for administration, and yet we operate and maintain the project entirely. It's become

increasingly difficult for us to see the benefit in paying all these administrative costs. That's one.

Second, because of tight federal budgets they had deferred a lot of the necessary maintenance on the project. That disturbs us because that tends to snowball in time like the lake problem up at Folsom with the defective gate which--

Swent: Just recently.

Bledsoe: --which had been mentioned needed repair some time ago. Anyway, these are two of the major things. If deferred maintenance creates a problem with the project which interrupts the water supply, it doesn't hurt the federal government but it sure hurts here.

Swent: Yes.

Bledsoe: So it's in our interest to have direct control.

Swent: So that's ongoing now?

Bledsoe: Well, we have put the proposal on the shelf for now. If the recreation continues to be a problem as far as getting approval from Congress, I don't know what the solution would be. So we're not doing anything right now.

Swent: So--

Bledsoe: We'll come back to it sooner or later. I thought it was interesting that Contra Costa is now attempting to get title to their facilities.

Swent: A similar situation. So, you did get the power plant going?

Bledsoe: Yes, in 1983 we generated the first power. Started construction in '81.

IV THE MCLAUGHLIN MINE BECOMES A SOLANO COUNTY CONCERN

1981: "We Were Going to Have to Take Notice"

Swent: So at the same time that the gold mine was coming in, probably your major attention was really going to the power. This was a--

Bledsoe: Right, yes, it was.

Swent: This was a little minor diversion at that point.

Bledsoe: Yes, but I realized very quickly that we were going to have to take notice.

Swent: So the discovery, most people say, was in '78; that the geologists found this gold up there in Napa County; and you said you first heard of it a couple of years later.

Bledsoe: Yes, I think in '81.

Swent: It was announced in the papers in 1980, August of '80, but Solano County was never mentioned.

Bledsoe: Yes, of course, the point is the proposed project was in Napa County, Lake County, and with a water storage reservoir in Yolo County. So definitely the project and their main focus in providing the notices that generally go out within affected jurisdictions went to those three counties.

Swent: Davis Creek is in Yolo County. This is where they decided, fairly early, to put a little storage dam with their water supply for the mine and mill.

Bledsoe: So basically, none of the project was in Solano County; but we thought at the time that the oversight was this rather huge interest in Lake Berryessa, and the proposed project was being

built alongside tributaries to Putah Creek, and therefore Berryessa. Whether or not they simply did not realize the concern we might have on the water quality, I felt it was an oversight. But anyway--

Swent: Was there public feeling that it was not oversight?

Bledsoe: Well, yes, there was some public feeling that perhaps we had deliberately not been notified because of the public sentiment regarding possible water quality problems up here.

Swent: How was this conveyed to you? How was it expressed?

Bledsoe: Expressed to me by certain political figures, members of city councils, board of supervisors. I'm getting it third-hand, but apparently some of their constituents had come and-- At any rate, because we were operating in '81, we were actually in process of signing a contract with the Bureau to take over complete operation of Monticello and, of course, had been for some years operating the rest of the project--the Putah South Canal.

In discussing it with the county supervisors, they felt that it was appropriate for SID to pursue this, to communicate with the proponents and with the various county planning agencies. Apparently early on, I guess, it was decided that Napa County would be the lead agency on the environmental reports and so on.

Betsy Marchand Gives a Warning

Swent: You might say how you first heard of this.

Bledsoe: I received a phone call from a Yolo County supervisor.

Swent: Who was that?

Bledsoe: This was Betsy Marchand. Betsy was apparently attending a, I believe, a planning commission meeting, during which Homestake was making a presentation on their proposal, and including their proposal on the Davis Creek reservoir. Betsy asked if I had heard about it and I said, "No. I wasn't aware of any gold mine proposal."

And she said, "You realize it's going to be in the Berryessa watershed."

I said, "No, I haven't heard anything about it." So I did attend the meeting that night, just to get some--

Swent: Where was it?

Bledsoe: The Yolo County engineering and planning section is not actually in the county buildings downtown; it's actually on the outskirts of town. It's their Public Works Center.

Swent: Outskirts of what town? Woodland?

Bledsoe: It's in Woodland. All the county offices, I believe, are in Woodland. They may have some branch offices.

Swent: I think so. I was asking because they did have a lot of meetings out in Guinda and Rumsey and those places, too, but this is--

Bledsoe: These were some of the early sessions, and I think it was in, as I recall, '81. I think they were just filing their permits finally in '81, weren't they? They were just at the point of beginning their environmental impact report.

Swent: The spring of '83 is when things all came to a head.

Bledsoe: And in '81, they were starting their environmental impact report, their environmental assessments, whatever.

Swent: Napa was chosen as the lead agency in June of '82, but by then they were well along.

Bledsoe: I can't say that I'm absolutely accurate on the date, because as I remember it was '81; it could have been even early '82, but it seems to me that phone call came during the wintertime, I think. So it may have been late '81.

Swent: So you attended that meeting.

Bledsoe: I attended the meeting.

Swent: Who else was there? Do you remember?

Bledsoe: As I recall, Ray Krauss of Homestake Mines was there and I don't recall any other players; but I believe that was the first time I got introduced to Ray Krauss.

Swent: And it was the Yolo County Planning Commission?

Bledsoe: Yes, the County Planning Commission as I recall. Betsy Marchand was following it very closely and very concerned.

Swent: What was your reaction to this?

Concern for Protecting Water Quality in the Berryessa Watershed

Bledsoe: Well, I was somewhat startled and came back, reported to my board and also to county officials, and suggested that we at least had better correspond or communicate with Homestake and with Napa County, in particular, and Lake County. We did--

Swent: What was your concern?

Bledsoe: Our concern was, number one: I did learn early on that they would be using cyanide in the processing; that was a concern right away, but we were already very aware of the fact that mercury was present, heavy metals in that area, because of the old mercury mines or quicksilver mines. Obviously, more open-pit mining in the area could increase our heavy metal concentration in Lake Berryessa. These were the primary concerns.

Swent: You had been monitoring for mercury all along.

Bledsoe: Yes, from at least 1958 or '59, had been monitoring the water quality. So these were the primary concerns: water quality. After all, that water supply in Berryessa, as I've indicated before, provided part of the drinking water supply for a quarter million people here at the time; that population now has swelled to close to 350,000, I think in Solano now. At that point in time, it was part of the water supply and drinking water supply for a large number of people in the county. I didn't anticipate, hopefully, there was no way that this would necessarily be detrimental to agriculture; but I guess that was always a possibility. The main concern--mine and the county supervisors--was the affect it might have on the municipal water quality.

I believe I alerted Ray to that even at that first meeting in Woodland.

Swent: Ray Krauss.

Bledsoe: Yes.

Swent: You alerted him to what?

Bledsoe: The fact that we were going to be very concerned about water quality in Lake Berryessa since his proposal was going to be draining into tributaries of Putah Creek.

Ray Krauss, Surprised at Solano County Interest?

Swent: Did he seem surprised that Solano County was represented at this meeting?

Bledsoe: I think he was a little surprised. And of course, I said basically, "At least SID has received no notices." I'm trying to remember because it seems to me that either he or somebody in the consulting staff which was already working with him indicated that they had sent a notice over to Solano County. Well, if it went to Solano County, it went to their Public Works section which has nothing to do with the water issues, or maybe to the Planning Agency, which again--certainly at that time--was not involved in water issues at all. I doubt that they would have even realized or recognized that they had seen such a notice, that that area drained into Lake Berryessa. So basically, the problem may have been that maybe perhaps some sort of notice may have gone out, but I certainly was never able to locate anybody who admitted receiving it. It certainly did not come to the county water agency or to SID or any of the cities involved.

Swent: So were you bothered by this?

Bledsoe: Upset, yes. In fact, I immediately sat down with our attorneys and began discussing what possible recourse we had--certainly take part in the hearings, hopefully if they would allow us to take an active part in the hearings--but beyond that what is our legal recourse to guarantee that the water quality will be protected. So, those were rather uncomfortable days early on; as we progressed in our communication with Homestake, things did improve, of course.

Swent: What did you do then? Did you call Homestake?

Bledsoe: You know, I have no record of my first conversation. I know that we did, again, attend hearings in Napa; there were at least two more hearings in Napa that we attended.

Mounting a Legal Threat Unless Solano County Is a Player in the Planning

Swent: When you said "we," you mean you and--

Bledsoe: --and our attorney. I don't know at that point in time whether--we had not brought in a consultant who we later brought in, as we sat down to negotiate after--. I guess, basically, there was no misunderstanding that perhaps what we were suggesting was a legal threat, that action might be taken unless, in fact, we were offered an active part in the planning for the project. We were not satisfied with just attending public hearings. We wanted--essentially, and I think rightfully so--[to be] at the table making sure we understood the planning, the design, and the protection of water quality. And to do this, we had to have our own consultants and experts sitting down with Homestake and their consultants, and actively involved to make sure that water quality was protected.

Swent: Now as I understand it--I may be wrong on this, but as I understand it--they were only applying for permits from the other three counties. They were not really applying to you for anything.

Bledsoe: They did not need any permit from us, but at the same time the Regional Water Quality Control Board has a tremendous amount of jurisdiction on the discharges and so on to the surface waters.

Swent: And this regional control board did include parts of those counties, did it?

Bledsoe: Yes. Basically, our loudest voice would be before the regional board. At the same time, we were making contacts with the regional board staff, and announcing our concern.

Swent: So you felt threatened and not represented in the process.

Bledsoe: That's right.

It was kind of an awkward situation because the possible threat to us was so potentially huge, and we really weren't sure how serious--because we were not at the table sitting down to fully understand the designing concepts, and what measures they were taking, or going to take, to prevent any effect on the water supply. You know, obviously weeks passed; there were a lot of communications; I find very little in my file of written communication; most of it was by telephone, including conversations between our attorneys and their attorneys. It

finally led to an--and I guess, under the threat of litigation and major opposition at the regional board--[they] decided to have meetings in San Francisco with the major players at Homestake.

Swent: D'Appolonia was--

Bledsoe: D'Appolonia was consulting, but--

Swent: Did you meet with them?

Bledsoe: Yes, we had meetings with them. We were also, though, meeting with the Homestake officials who were at the main office.

Swent: Who were they? Do you remember?

Bledsoe: Isn't it awful?

Swent: Goldstein--

Bledsoe: Well, Goldstein was their attorney.

Swent: One of the attorneys.

Bledsoe: Dennis Goldstein, certainly, yes. We met with Dennis. But who was the president or board chairman, or whoever the--

Swent: Conger?

Bledsoe: --the manager--they have an executive?

Swent: Well, let's see: James Anderson?

Bledsoe: No, that doesn't strike a bell.

Swent: Harry Conger was president, I think.

Bledsoe: I'm trying to remember the name of the gentleman--very nice gentleman. He was head of the San Francisco office, I believe. He signed the agreement. [reads agreement] "Chairman of the Board"--I can't read his signature--

Swent: Well--Conger--

Bledsoe: Conger, yes; it was Conger.

Swent: Harry Conger. In 1981, Conger was chairman and president; James Anderson was vice president; William Humphrey--

Bledsoe: Yes, William Humphrey was the person who was the executive vice president and was certainly present at many of the meetings in San Francisco.

Swent: And Goldstein and Krauss--

Bledsoe: Goldstein and Krauss and--

Concern Both for Domestic Population and Industrial Water Users
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Swent: You had said that you wanted to add one of your other concerns.

Bledsoe: I had mentioned, yes, that regarding our concerns on the water quality question, the primary concern about the large population here that uses this as part of their drinking water supply. But Solano also has a large number of both food and beverage processing in the various cities--Vacaville, Fairfield, and Vallejo. Because these products are distributed on a very widespread basis, obviously there was concern for there for the industrial user, also, in addition to the domestic population.

Swent: There was a huge consciousness of mercury at about that time, in general: the tuna fish scare--remember there was a time when suddenly the whole nation was very concerned about mercury.

Bledsoe: We had some local concern regarding Clear Lake and the fish population and warnings going out in Clear Lake; and some of the coves even on Berryessa, where they do find mercury in the sediments on the bottom of the lake. So if you have fish that are feeding on the bottom life there, there obviously would be a concern about a steady diet of fish in that area. We find at the present time--and except for some early monitoring after Monticello was finished--we find no detectable trace of mercury in the water coming out of Berryessa, so we are very confident, at this point, that we do not have a problem as far as the water quality is concerned.

Swent: That was your responsibility.

Bledsoe: It was our responsibility to be concerned about it; and in fact, we knew that mercury could be present--had been present--in Berryessa, and the specter of increasing this runoff into the drainage area and into the lake was obviously a major concern.

Swent: I guess we should say this was naturally-occurring mercury; it wasn't anything that Homestake was introducing.

Bledsoe: Right. Except that the increase in open excavation up there could increase the problem or enlarge the problem. Certainly, it had existed since the early days of the old quicksilver or mercury mines in the area; and those mines have not been sealed or closed as is required these days.

Swent: So just the groundwater seeping through would have--

Bledsoe: Even seepage, yes, from groundwater would--

Swent: The cyanide was something they were introducing in their processing.

Bledsoe: Right. And the agreement that we finally set up with Homestake has had some very stringent restrictions on the transport of that cyanide in and out of the site.

Demanding Absolutely Fail-Safe Containment of Tailings

Swent: The drainage from the processing plant was not going into Berryessa.

Bledsoe: No. Containment was our first concern. Containing all of the tailings certainly from the process and our own consultants, when we did finally sit down with Homestake to look at their design and their proposal, and have our scientists and experts checking the proposal carefully--in fact, making some changes or suggesting changes with Homestake's engineers. The focus was to have an absolutely fail-safe containment of the tailings; and any seepage that might occur from that tailings area, to make sure that it was recovered and put back into the pond. That was a major concern.

Swent: I guess we're jumping ahead, but I was thinking that the drainage from tailings--even if it were not contained--that's a different drainage basin, though, isn't it?

Bledsoe: No, no.

Swent: Is that still in the Berryessa watershed?

Bledsoe: Yes, that's still in the--yes--Hunting Creek definitely goes in to Putah Creek--and Knoxville Creek. Only Davis Creek is on the

Yolo side; the other creeks in the area do drain into Putah Creek or directly into Berryessa.

Swent: Okay, so you were concerned all the way around, then?

Bledsoe: Yes, not just from the containment of the tailings, but also the spoil area for the excavated material.

Swent: At the mine--

Bledsoe: At the mine itself, yes.

Meetings in San Francisco with Officials and Attorneys

Swent: So, let's go back then. You were speaking about your very first meeting in San Francisco with Conger, Langston, and Humphrey.

Bledsoe: We did have several attorneys from both sides present, and engineers, consultants. We had several meetings, and some of them all-day meetings, in San Francisco. Very frequently, particularly I think in the later meetings when we were sitting down to have our consultants review their plans, the engineers and scientists were in one room, and the attorneys and administrative people were in another conference room going over details on the legal agreements.

Swent: So your concern was technical and also political.

Bledsoe: Technical and political, yes. Obviously, they're closely related--because of all the people involved on the technical side and the possible detriment to a civilian population. That can't help but become political at some point.

Swent: Of course. People always get involved, don't they?

Bledsoe: Yes.

Swent: What authority did you have?

Bledsoe: We had no authority to regulate, certainly, and we were in no position to issue any permits because the project was totally outside of our jurisdiction--not only SID's jurisdiction, but also Solano County's jurisdiction. So, yes, you're right; we had absolutely no regulatory control. All we were able to do was either to try to block the permits at the regional water quality control board level--and we were preparing to do that,

do anything we could to block it unless we were able to sit down with Homestake, and sit at the table, working on design, understanding with our own consultants, totally reviewing all aspects as it related to water quality, drainage, seepage, the containment of anything that might create water pollution. But you're right; we had no regulatory controls, so all our moves had to be either through the meetings with, and statements and comments to the regulatory authorities--chiefly, the water quality control board and other Napa County officials; or, to take a legal course, and at some point file suit on either the inadequacy of the environmental documents that they were working on and other related permits.

Swent: Did you feel that their plan was inadequate?

Bledsoe: Yes, we did--because our own consultants spotted a few things in the--

Swent: Do you remember what they were?

Bledsoe: No, I don't. Quite honestly, Lee, I don't recall the details. Obviously, if nothing else, perhaps it was the lack of detail that worried us; and this comes from working on the outside. We felt it was so important that we had to have experts inside talking to the people who were doing the design work, making sure that we were protected.

Swent: Did you have allies from the other counties, or were you working on your own?

Bledsoe: Yes, we did have some cooperation--not full understanding, because it wasn't their water supply. But yes, we had cooperation from Napa and Lake counties--and certainly Yolo, too. Although Yolo's concern was the water supply, which was not related to our problem at all. We were on mailing lists and did get due notice after we protested loudly that we were not being kept informed; we did have cooperation with them in that sense.

Swent: Were you in touch with any of those groups that organized in opposition up in Yolo County?

Bledsoe: No, we were not.

Swent: There were a couple of very vocal groups up there.

Bledsoe: Our real driving force, I think, was possibly a little different from the concerns of other groups. Not a direct relationship with them.

Requiring More Monitoring: Daily, Not Monthly

Swent: So you had your own consultants. What did they do?

Bledsoe: Well, first they were looking at some of the draft environmental documents; and then finally, when Homestake agreed that we should sit down and work together--that they were willing to work with us--we brought them into meetings with Homestake's consultants. A large number, I think, of recommendations for improvement--at least on the containment facilities and monitoring, we wanted more monitoring than they had proposed--a lot of those monitoring proposals came from our consultants.

Swent: I just checked some of the newspaper record, the Woodland paper, that is the Woodland Daily Democrat; on May 26, 1983, you were quoted as saying, "I don't think that we would be satisfied with anything short of daily monitoring--at least at the start." Jack Thompson, of Homestake, had promised monthly monitoring--this is monitoring of the effluent.

Bledsoe: Yes, and that was the flows into Hunting Creek, as I recall, which is a major tributary of the Putah Creek. That's exactly right. As I indicated, our own consultants finally succeeded in getting Homestake to agree that there would be even continuous monitoring at all the major points downstream. We have recording equipment down there as a result of our concerns and suggestions; so the system that we have now for monitoring is many times greater than what had been originally proposed. And after all, this is the only way that we feel safe that there are no unusual occurrences between these spot samples.

Swent: So this is monitoring the stream, the flow of the stream, between the mine and Lake Berryessa?

Bledsoe: Between the mine and--yes--Putah Creek. Hunting Creek flows into Putah Creek not too far upstream from Berryessa. It's a very short distance, actually, from that junction into Berryessa.

Swent: You hired your own consultants. This is from the Sacramento Bee of May 27, 1983: you announced that you had hired a consultant to determine whether pollutants could work their way into Lake Berryessa.

Bledsoe: Yes, that was a consulting firm--and I'm sorry, but I don't have that name in front of me right now. They were special environmental consultants advising us early on, and then later sitting down with us and Homestake's engineers to hammer out

some better monitoring and even some additional safeguards with regard to containment, particularly of the tailings.

Swent: At this point, what was being held up was simply the acceptance of the EIR [Environmental Impact Report], I think.

Bledsoe: I think so, yes. I think that we were raising substantial questions which could, in fact, create a real problem if in fact Napa had moved ahead to approve the EIR with some outstanding, unmitigated problems. We were contacting the regional board at that time, and the regional board had some serious concern that some of our comments had to be addressed.

Swent: This is the water quality board.

Bledsoe: Yes.

Swent: Well, it was July '83, that the EIS [Environmental Impact Statement] was certified--

Bledsoe: --by Napa. That was after the date of our agreement with Homestake. Our official agreement was in June of '83, wasn't it?

Swent: And what was the gist of this agreement?

Bledsoe: Basically, the agreement--

Swent: This is quite a document.

Bledsoe: It's quite a document.

Swent: A lot of pages, there.

Bledsoe: If I were going to summarize in a very few words, it officially sets forth our cooperation. It locks in the monitoring program that we had both agreed to--

Swent: Which was continuous?

Bledsoe: Yes--and basically, a number of monitoring points; one of those is continuous. The program that our experts had recommended. Under the terms of this agreement, we both submitted this plan to the regional board and asked them to incorporate it in the permits, which I believe they did in all cases. So it actually went beyond what the regional board might have required.

Ensuring Future Oversight

Bledsoe: The second part was in fact to ensure future oversight that we would jointly agree on hiring an expert to provide some overview periodically to report to SID regarding success of the containment program and any impacts, if any, on the water quality. This gentleman was hired--

Swent: Do you know who that is?

Bledsoe: Yes. Jim Rouse, Geochem Division. Their offices are in Lakewood, Colorado.

Swent: And he's continuing to oversee the mine area.

Bledsoe: Yes, and I think probably the most important and recent report after a long oversight on this, was given to us in April of '94, last year. Very encouraging report, because he's found no impact on water quality from the Homestake operation.

Swent: There was something about seventy-six years, wasn't there?

Bledsoe: The reclamation project: we are requiring, I believe, fifty years under our agreement, a fifty-year reclamation period after closure. I believe that's correct, Lee, and I'll have to--

Swent: Of course that is after closure, and this is twenty-five years, so--

Bledsoe: There is a lengthy period of monitoring and inspection of this site after closure for a period of fifty years.

Swent: That's a long time.

Bledsoe: As I understand, Homestake is turning over much of this for research by the University of California and others, who will actually be playing a major part in that reclamation project and carrying out some of their programs.

Swent: Was the monitoring to be down-scaled later on?

Bledsoe: Yes, it will be downscaled; but here again, there will have to be continued monitoring where the drainage from the area enters Putah Creek. That will take place for quite some time. The other item that I wanted to mention: the fact that, yes, the reclamation of the site was an important issue, and it is addressed by the agreement. That was also important that they not simply close and walk off and leave the site. The agreement

on the reclamation plan was extremely important. So that was part of the agreement. If you're summarizing in a few words, those were the major things that are contained in the agreement. There's a lot of legalese regarding what each is supposed to do and defining all the terms that are used in the proposal.

Swent: Were you being pressured? What sorts of pressure were you under from your constituents?

Bledsoe: Certainly our constituents, including our local elected officials, my board and other boards and councils, city councils--were getting frequent updates, very concerned that we do everything possible to guarantee there would be no chance--even a remote chance--that we would have major water pollution in the lake. That amounts to some pressure, yes. I felt that we were doing everything we could.

The Result: "Outstanding; One of the Cleanest Mining Operations"

Swent: Were they satisfied?

Bledsoe: Yes they were. In fact, I have made three or four trips to the Homestake site, particularly to take some of the local officials up there and show them what we did achieve, what Homestake was doing. And I think everyone has come back quite satisfied that the operation is possibly one of the cleanest mining operations in recent history. It certainly has, I think, been outstanding. Our experience has been very good. I do think it was important that we worked closely with them for both our benefits to make sure that there were no accidents.

Swent: Keep everyone's feet to the fire?

Bledsoe: That's right. For their benefit also.

Swent: That was a great deal of extra work and expense for your office, wasn't it?

Bledsoe: Yes. Some of that came back in sharing with some of the local agencies, but we picked up the major part of the overhead. However, keep in mind that about 70 percent of the total annual water allocation up there does go to SID, so we have a large stake in the total water supply. And we now are using some of our own allocation for municipal supplies, industrial supplies. So it is not only important to the cities, but to SID who's also providing water for that type of municipal and industrial use.

The Future of SID: Inevitable Adjudication Over Water Rights

Swent: And the projects that you're continuing to work on now, though, are other projects, aren't they?

Bledsoe: Yes, for the most part, we are involved in an inevitable water rights adjudication. I say inevitable because of the very peculiar nature of the permits that were issued by the state board for the water rights on this project. They were unusual in several respects; and quite honestly, final license for those water rights could never have been issued without either action by the court or action by the state board, a major investigation by the state board before any licenses could be issued. What I'm pointing to specifically, one major issue: for the first time that I'm aware of--the state board staff tells me that it's the only case they know of--where in the issuance of a water right permit, the state board set aside a reservation for future filings--not existing water rights. Those existing water rights have a priority, anyway, over any permit that we might have received, but the water right was restricted to the extent that there was a reservation for some 33,000 acre feet of future filings in the Berryessa watershed--in other words above Monticello Dam. This would be for Lake County and Napa County future filings.

It was a very unusual provision, but then the state board said to the extent that that 33,000 or any portion of it had not been put to use at the time Solano goes to final license--which was to occur in 1994, that was the term of the program--that should any of it be not put to use by the time Solano goes to license, any unused portion would revert back to the project water rights--in other words, back to Solano. It was important, here again, how much water has been put to use. The state had estimates only, no accurate record of who was using the water, how much had been put to use. It was going to take an exhaustive inspection and investigation, either by the state or by experts hired in a court action, which is a court adjudication. You can also have adjudication through the state board, too. There is no other recourse in this case, so for that reason I say it was inevitable that something had to take place before licenses could be issued. All the permits, including all those people up there who were using the water, either thought they had a right or did have a right, depending on what stage of the process they were in on their permits.

The same thing, major questions being asked because the state had decided that they were going to make these releases in the Putah Creek downstream from the dam: those had been in

question, and repeatedly they had the bureau do a fifteen-year study, as part of the permit requirement, on the effect of these releases on the creek--particularly on the ground water recharge. That investigation was done; certain recommendations and a fixed release schedule was set up in 1970 by the state board. It determined how much water would be released each month of the year. And this was put in place; it has been challenged several times.

The worst calamity was the seven-year drought, of course; the real culprit, for the first time except for one time in '77, I believe: for the first time, Putah Creek went completely dry in some areas, particularly around Davis, at the University of California. Our only requirement was to release the amount of water stated in the permit--as far as we were concerned, a mandatory requirement for SID. Keep in mind we're operating as a contractor operating the project--we must follow the guidebook that the bureau has set down for an extensive operating procedure, which we had to follow; that includes following all the permit terms and conditions and releases to Putah Creek and so on. During the drought, Putah Creek went dry--

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Bledsoe: We heard that one of our neighbor agencies in Yolo County was preparing to file suit against us because we wouldn't release more water down the creek. [That] led to a decision here that it was necessary that we start the inspection and investigation to determine who has rights to the water and how much; not only upstream, but all the way down the creek--because people, we found during the drought, because their wells had perhaps dropped off a little bit, were putting pumps into Putah Creek. We were releasing water from the dam, supposedly for recharge and also, incidentally, keeping fish alive; people were putting pumps in the creek down there in the Davis area, pumping large amounts of water. So no matter what we did to increase the releases, the more we released the more they were going to pump.

Caught between a rock and a hard place. What do you do? We didn't want the fish to die, either. But there was no question about it; just releasing more water wasn't the answer. And yet, as I say, one of the neighboring cities was going to try to make a court case out of it and force us to release water. That being the case, we decided we had no choice but to file for adjudication: either have the state or the court decide who had rights to the water, how much water could they take, and finally settle this and issue the licenses--which were really due, anyway, because the first permits were issued in '55. As I recall, the term of the permit was '94; but we got that

extended, of course. Anyway, so much for the water rights issue. That's a very quick summary, and that's one of the things that we're still working on.

Swent: You have a lot on your agenda there.

Bledsoe: Yes, I do keep busy; but I'm trying to only work two days a week.

Swent: So a little gold mine was just kind of a blip on the total picture.

Bledsoe: Right, but it was an important one. I'm very pleased that the relationship has worked out finally as well as it has. We couldn't be happier with the results of the operation up there. It has operated very safely, and we've had no detrimental effects down here. And in the meantime, I think we've worked out a good relationship with Homestake.

Swent: You feel that you had done your job?

Bledsoe: We had done our job; but whether or not we are responsible for this success remains to be seen. It's really an unknown. But I think we did our job and did the best we could; and perhaps some of what we suggested to Homestake, some of the precautions, have paid off for our benefit as well as theirs.

Swent: I didn't say anything about air quality, but were you working at all with the air quality people?

Bledsoe: No, we weren't. I believe that was Yolo's concern because they're downwind. The asbestos--you know, in the serpentine formations up there, with all the crushing and everything that was going on, obviously there was going to be some asbestos fiber released. We, at first, asked our experts to take a look: "What is this fiber going to do as far as water contamination?" They dismissed it. Nothing indicates that asbestos in water is harmful.

Swent: No.

Bledsoe: But it is an air quality problem. We didn't get into that issue. That was Yolo County's issue, I'm quite sure, one of their issues. It may have been an issue with some of the other groups that were protesting. We tried to stick with our main objective: protecting the water quality.

Regulating the Transport of Cyanide

Swent: We talked about the containment, and I think we did briefly mention the transport of the cyanide. That was a concern.

Bledsoe: Yes, because particularly they were planning to improve that road. If you had seen the old road that had been there, you'd really have concerns [about] the possibility of their transporting cyanide in there during inclement weather or at nighttime over those roads. Because some of the little drainage channels that crossed the highway, do get back into Hunting Creek or Putah Creek eventually; and we wanted to make sure that: number one, we restrict the times of day and type of weather during which they could transport; secondly, to have a plan for immediate containment of any spill that might occur--even to the extent of having some ponds or sand or something ready to doze into those channels should it occur so that there could be containment. So, yes, cyanide transport--after we took care of the containment problem--the cyanide transport was a concern.

Swent: I guess those were really the two items--

Bledsoe: Yes, I think. As I understand it--I haven't actually seen it--but I think Homestake has been asking for expansion of the hauling or transport periods now. Again, I'm not sure that we can agree to expand that. I haven't gotten in on the discussion.

Swent: You mean--

Bledsoe: Expand the hours during which it could occur.

Swent: I think at first they were only going to transport part of the year; and then they changed that to a longer--

Bledsoe: And maybe that's it. I didn't really ask about the discussion. Maybe it's a seasonal adjustment.

After Many Years, No Threat to the SID Waters

Swent: Because of the difficulty of storage up there, I guess. But all seems to have come out satisfactorily.

Bledsoe: Here again, I refer to Mr. Rouse who has done the work on the oversight. [looks at report] I might just very quickly quote from the general conclusion: "McLaughlin mine and mill is operating in accord with existing permits and agreements"--including our agreement. Technical exceedances to permit criteria reported during the winter of '93 resulted from excessive precipitation events, and did not impact water quality in Hunting Creek to receiving water. The reclamation of the waste rock is proceeding. Surface and ground water monitoring is being conducted in accordance with the approved monitoring plans, and yields data of high quality." He's talking about our approved monitoring plans. "The McLaughlin Project is operating as designed and permitted, and poses no threat to the quality of SID waters."

So this is after a number of years, now, of monitoring, and everything is I think a sign of success. And we're pleased.

Swent: You can feel a job well done, then, I guess.

Bledsoe: I certainly hope so.

Swent: Was there anything else? These are all my questions. Did you have any others?

Bledsoe: I guess the question, Lee: did you want copies of some of this stuff sent to you, some of the narrative pages or--?

Swent: I would like those first narrative pages there. I think that would be--

Bledsoe: Okay, sure. I'll copy the narrative pages and mail them to you.

Swent: I would appreciate that very much, yes. Okay? All right, well, we've covered a lot of ground.

Bledsoe: Yes. I hope we didn't wander off the path too much.

Swent: No, I don't think that--. Let's see. Unless there's anything else that you would like to say about any of the people that were involved in all of this. Were there other county, SID people?

Bledsoe: Not really, other than, you know, basically on the site. The most active participants were me, of course, and our attorneys.

Water Law Specialists Minasian, Minasian, Minasian, et al. of Oroville

Swent: Who were your attorneys?

Bledsoe: Minasian, Minasian, Minasian, Spruance, Baber, Meith, and Soares.

Swent: Good gracious.

Bledsoe: The letterhead is quite-- We called them the Three M's. There it is [offers letterhead].

Swent: Minasian--oh my goodness! Minasian, Minasian, Minasian, Spruance--good gracious!

Bledsoe: There's only one of the Minasians that's still active in the firm, and one other living. One is deceased. So the people keep asking why they don't shorten the name.

Swent: Soares. These are attorneys in--

Bledsoe: Oroville.

Swent: Oroville! Why did you go all the way to Oroville?

Bledsoe: It's a long story, but Mr. Jack Minasian--who was the senior in the firm who's deceased now--Jack Minasian drew up the formation documents for SID. And they didn't act as attorneys for the district until I took over as manager. I wasn't satisfied: we had a local attorney who was no water expert, no water law expert. And I was looking--in fact, I even consulted my local attorney and said, "We have got to have a good water law legal counsel." I started looking back on the history and saw Jack Minasian was still renowned. So I called Minasian, interviewed several others; but I called Minasian and asked him if they could take us on as a client for the first time since 1948.

Swent: Well!

Bledsoe: But this was 1972. It's kind of interesting. Jack Minasian was in on the early project dealings. But, yes, they are quite well known in water law, which is a very special field.

Pomo Indians Are Now A Constituency

Swent: And increasingly important, isn't it?

Bledsoe: Yes, I think right now the Solano Project, Putah Creek adjudication will probably have every water attorney in Northern California involved. I have never seen so many attorneys, so many parties. Now, the latest, latest party which did not even show their heads until we had a settlement agreement worked out with all the people up in Lake and Napa counties--had worked with a multitude of people up there; finally reached a settlement agreement--and suddenly the Pomo Indians show up. "By the way, we would like some water, because we want to build a casino up there in Lake County reservation." They own a piece of land up there. So the Pomo Indians raised the question, and the first thing we know, we're getting calls from the Department of the Interior Division of Indian Affairs. Well, they swing a big stick. So the settlement agreement is on hold right now until we get the Pomo Indians satisfied.

Swent: Do you have Indians in Solano County? Is there any Indian rancheria here?

Bledsoe: No, no. Yolo does, and Lake County, I guess. I don't think Napa has any.

Swent: Not that I know of.

Bledsoe: And I'm not aware of any in Solano County.

Swent: No. Oh, my.

Bledsoe: One of the fun things.

Swent: Okay, well, does that do it, then?

Bledsoe: Lee, if you're satisfied, I don't know what more I could say.

Swent: Okay. I think this is just fine and I thank you very much.

Transcribed by Lisa Vasquez
Final Typed by Shana Chen

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APPENDIX A

JAMES ANDERSON

Homestake Mining Company
Regular Meeting of the Board of Directors
November 14, 1980

Exploration Division -- Request for Expenditure No. EX-80-D-1

At the invitation of the Chairman, Mr. James A. Anderson, Vice-President, and Mr. Donald L. Gustafson of the Reno office joined the the meeting.

The Chairman reported that a request has been received from the Exploration Division to expend $10,195,000 to conduct deposit development at the McLaughlin Project. He recommended approval.

After discussion and on motion duly made and seconded, the following resolution was adopted unanimously:

> RESOLVED, that Request for Expenditure No. EX-80-D-1 by the Exploration Division for $10,195,000 to conduct deposit development at the McLaughlin Project, be and hereby is approved.

At this point Messrs. Anderson and Gustafson were excused from the meeting room.

from Homestake Mining Company's
1980 Annual Report

Exploration Division

In 1980, Homestake continued its aggressive exploration program which was launched well before gold and silver prices rose to present levels. We spent $18 million on exploration and development work and our 1981 budget will be higher. Our efforts will focus primarily on promising gold and silver prospects in the United States. The primary objective of Homestake's exploration program is to expand our position as the country's largest domestic gold producer.

Our recent exploration efforts produced a major gold discovery in 1980, 70 miles from San Francisco, California, at a site where gold was not mined previously. The McLaughlin Project contains in excess of six million tons of ore at an average grade of approximately 0.17 ounces per ton, or more than

James A. Anderson
Vice President, General Manager
Exploration Division

one million ounces of gold.

The Exploration Division has expended approximately $5 million to date at the McLaughlin Project. We will continue exploration and development activities over the next 12 to 18 months to determine the full extent and economics of the gold deposit.

During 1980, the Exploration Division screened over 800 properties and conducted field examinations of over 500 precious metals prospects in the U.S., Canada and Australia. Land positions were obtained on 24 properties, bringing our portfolio of precious metal prospects to 62. These prospects are in various stages of the sequential exploration evaluation process, which includes Reconnaissance (selection and prioritization), Target Evaluation (initial exploration testing), Ore Target Evaluation (advanced exploration testing), and Deposit Development (deposit delineation, engineering and feasibility).

At year-end, the McLaughlin Project was in Deposit Development, four projects were in Ore Target Evaluation and nine projects were in Target Evaluation. Three Target Evaluation projects were completed and abandoned in 1980.

Exploration efforts for silver were primarily concentrated on continued evaluation of Homestake's 50 percent interest in the Bachelor Mountain deposit near the Bulldog silver mine in Colorado's Creede Mining District, where drilling and metallurgical testing were continued in 1980.

Homestake also continued its efforts towards uranium, lead, zinc and copper discoveries. Uranium exploration is the responsibility of the Energy Division. Lead-zinc reconnaissance is carried out in southeastern Missouri. Copper exploration is carried out in Wisconsin through a joint venture with American Copper and Nickel Company.

In response to increasing competition for promising gold and silver prospects, Homestake improved its exploration models and designed new computer-oriented systems for deposit evaluation, feasibility studies, and mine design. The Exploration Division expanded its Land Department to meet increased activities. These and other efforts will help Homestake retain its competitive edge in precious metals exploration and development.

AMES A. ANDERSON
Vice President, Homestake Mining Co.

old—its history and role in the U.S. economy and the U.S. exploration program of Homestake Mining Co.

from Mining Congress Journal, January 1982.

estake Mining Co. has had a long and cordial re-nship with the American Mining Congress, which s represented the mining industry in Washington ce 1897—just 20 years after Homestake was first sted on the New York Stock Exchange. Over the any years of this relationship, Homestake and the Mining Congress have witnessed and interacted in rious governmental policies and attitudes toward d. These attitudes are being reexamined today and me of the government policies that evolve from this examination could influence the industry's precious al exploration. The subject of precious metal explo-tion represents a broad scope of activity. These re-arks will, therefore, focus on two topical consider-ons—the U.S. financial history of gold and, with is background, Homestake's gold exploration in the United States.

e first part of this discussion shows that the gold ice generally acts as a thermometer of the economic s of the country rather than the cure for those ills. ere are several ways of reading the thermometer both terms of the success and failure of certain federal vernment policies and in Homestake's attitude to-ard investing in gold exploration in this country. nsequently, the second part of the discussion sum-s Homestake's exploration program and invest-t commitment to discover new gold deposits.

omestake Mining Co. is the largest gold producer in the United States and holds the largest known reserves in North America. Its position as the er domestic gold mining company has for years based on the production from the Homestake in Lead, S.D. More than 33 million ounces of have been extracted from this single location the last 100 years.

mestake's position was strengthened in 1980 with discovery of another major gold deposit, the ughlin deposit, in a remote part of Napa County, That discovery was the result of an aggressive, technology exploration program begun in 1978. estake now estimates that the McLaughlin depos-tains 3.2 million oz of gold—at least 20 million t ore with an average grade of 0.16 oz of gold in ton. The McLaughlin project is expected to be in tion as a full-scale mine in 1984.

th the Homestake mine, the McLaughlin discov-nd a continuing long-term gold exploration pro-. Homestake expects to remain the leading do-ic gold producer in the coming years.

Free market providing incentive for gold mining

Major increases in world gold market prices during the free-market system of the past ten years have created attractive operating margins, and thus new incentives for gold exploration, development and mining in the United States. The magnitude of this renewed profit incentive is depicted in the plot of gold price against the Consumer Price Index in fig. 1.

The federal government has "fixed" the U.S. currency value of gold under various forms of the gold standard for 160 of the last 190 years. Conversely, free-market forces have established the value of gold on just two occasions during the same period, spanning a total of 30 years.

The dollar value of gold was first maintained at a fixed price by the 1792 Mint Act which established a Bimetallic Standard for U.S. currency. The standard was based principally on silver in which the U.S. dollar was equated to 0.774 oz of silver, with the mint required to maintain a fixed silver gold ratio of 15:1. This established a fixed price of gold at \$19.38 per ounce which was maintained until 1834 when the silver/gold ratio was changed to 16:1, elevating the fixed price of gold to \$20.67 per ounce.

This fixed price for gold persisted until 1861 when a free-market system called the "Greenback Era" prevailed during the events surrounding the Civil War.

Price of gold increased to \$35 in 1934

The deflation following the Civil War caused prices to fall. In 1879, the U.S. government reestablished the fixed price of gold at the pre-war value of \$20.67 per ounce, establishing parity with the value of the dollar as indicated by the Consumer Price Index. This fixed price was maintained through the inflation of World War I and the depths of the Great Depression. But in

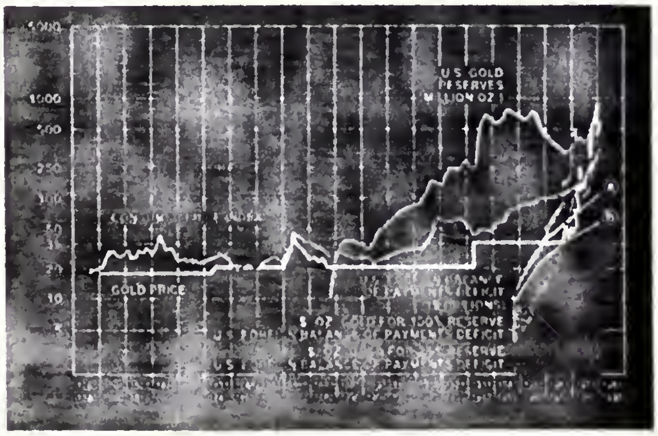


Fig. 1. Historical record on gold in the United States since 1789

1934, the government finally devalued the dollar by increasing the price of gold to $35 an ounce, restoring gold's purchasing power to near parity with U.S. currency.

The $35 an ounce gold price was retained by the 1944 Bretton Woods Agreement, which adopted a gold-dollar standard using the U.S. dollar as the official reserve currency for the newly established International Monetary Fund. Under this agreement, the U.S. dollar was defined as being 1/35 of an ounce of gold. The U.S. agreed to settle all foreign accounts with gold bullion payments and receipts. Dollars and dollar credits held by foreigners were to be counted as reserves equal to gold. This established the gold-backed U.S. dollar as a world reserve currency and stabilized international currencies until the 1960s, when various factors reduced the world's confidence in the ultimate ability of the United States to redeem its currency and debts in gold.

Some of the factors that undermined world confidence in the U.S. dollar were:

1) The rapidly increasing U.S. balance-of-payments deficits during the 1950s (see fig. 1);
2) The rapid growth of gold-backed U.S. dollars as international reserves (Eurodollar reserves) and resulting major extensions of bank credit (Eurodollar loan liabilities);
3) Persistent inflation in the U.S. (decrease in real purchasing power of outstanding money balances as indicated by the CPI).
4) Mounting U.S. federal debt.

U.S. government reserves halved in eight years

This decreasing confidence in the dollar forced the London market price of gold to reach $40 (price on the London Free Market for Gold, established for convenience in 1954) an ounce in October 1960, when the U.S. foreign balance-of-payments deficit exceeded the total value of U.S. government gold reserves at the fixed price of $35 an ounce. As a result, foreigners accelerated their conversion of dollars to gold, reducing the U.S. government reserves from approximately 600 million oz to about 300 million oz between 1960 and 1968 (see fig. 1). During 1968, the outstanding U.S. foreign balance-of-payments deficit exceeded the U.S. gold reserve, valued at $35 an ounce, by four times. In other words, the deficit was backed by less than 25 percent gold reserves. Rather than devalue the dollar to maintain at least a 25 percent gold reserve backing to foreigners, the U.S. government stubbornly clung to the "official" $35 an ounce value of gold but implemented a policy to confine its gold sales to foreign central banks.

Under this policy, the U.S. Treasury exchanged gold for dollars only with foreign central banks and at the "official $35 an ounce value." For other transactions, the U.S. government recognized the free-market dollar value, but it did not exchange gold at that price. (U.S. citizens were still not allowed by law to own gold bullion). This policy established a "two-tier" gold pricing system in the U.S.

The continuing weakness of the U.S. dollar as an international currency led to the establishment of a new international reserve system in January 1970, comprised of Special Drawing Rights (SDR's—paper gold), gold, dollars and foreign currencies. But foreign central banks continued converting U.S. dollars into gold at the "official" fixed price of $35 an ounce. By early 1971, the U.S. government faced another critical point when U.S. currency in domestic circulation also exceeded the 25 percent gold reserve backing at $35 per ounce (actually, Congress had revoked the requirement for a 25 percent gold backing of U.S. currency as early as 1968). Rather than devalue the dollar, the U.S. government stopped the conversion privilege of dollars to gold in August 1971 and allowed the value of the dollar to "float" on international money markets in December 1971.

Dollar devalued in 1971 and again in 1973

For only the second time in our history, the government had abandoned the gold standard (a fixed dollar value for gold). The previous instance was during the "Greenback Era" (1861–1879). For the purpose of establishing its International Monetary Fund reserve positions, the U.S., in an agreement called the Smithsonian Accord, accepted devaluation of the U.S. dollar to $38 an ounce in December 1971. Again, for IMF purposes, the dollar was devalued to $42.22 an ounce in 1973. But the international pressures on the value of the U.S. dollar have not ceased. Since the Organization of Petroleum Exporting Countries (OPEC) oil embargo in 1973, the United States' balance-of-payment deficits, federal debt and domestic inflation rates have worsened markedly. To put this into some kind of perspective, were the U.S. to settle just one of its outstanding monetary obligations, its foreign balance-of-payments deficit, with its current gold reserves, gold would have to be valued at $830 an ounce.

World political tensions and uncertainties—such as the OPEC oil embargo—do affect free-market gold prices as seen by wide fluctuations in the free-market value. The exile of the Shah of Iran and major increases in OPEC oil prices during 1979 drove the price of gold from $230 an ounce to $498 an ounce by mid-December. When in late December 1979 the U.S. government froze Iranian assets in U.S. banks, the gold price for the first time exceeded $500 an ounce. By the time of the events surrounding the silver commodity market speculation debacle in March 1980, gold prices had soared to $850 an ounce. The question remains as to whether there is a correlation between that top dollar value for gold and the corresponding balance-of-payments deficit value of $830 an ounce mentioned earlier. Whatever the correlation, when the Iranian tensions eased, oil became more plentiful, and the U.S. Congress passed the Reagan economic package to curb domestic inflation, gold prices dropped back to between $385 and $435 an ounce in August 1981.

Incentives for gold exploration and mining identified

Homestake Mining Co. has been producing gold at Lead, S.D. for 104 years, 94 of which have been under some form of a gold standard. During this time there have been periods when gold prices have been equivalent to cost inflation, providing incentives to find, develop and mine gold. On the other hand, periods of inflation and fixed prices have produced inflationary

cost squeezes, often creating unfavorable climates for mining gold.

The mining industry recognizes there have been times, historically, when investment in gold exploration and mining has been more reasonable than at others. The incentives for such investment are essentially: a) the ability to make a profit on the investment; b) improvements in exploration and mining techniques that make once-marginal deposits economical to process; and c) favorable prospects for the future purchasing power of gold.

A number of periods in our nation's history have provided profit incentives to find, develop and mine gold; on the other hand, fixed-price, inflationary-cost squeezes have often created disincentives to invest in gold mining. The 190-year relationship between U.S. gold prices and the U.S. Consumer Price Index (which, in a general way, reflects mining-cost inflation) provides a means to identify favorable and unfavorable periods in the history of U.S. gold mining. In general,

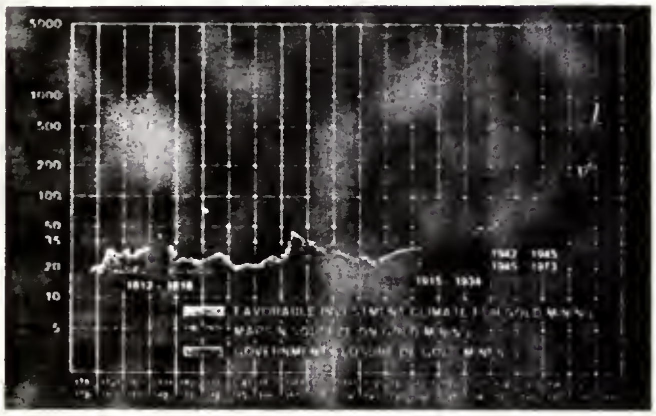


Fig. 2. Favorable and unfavorable periods for gold mining in the United States.

except for a brief inflationary period between 1812 and [illegible], an attractive investment climate existed for U.S. [illegible] mining during the 123-year period from 1792 until 1915 because the long-term trend in costs generally paralleled changes in the gold price (fig. 2).

Strong inflation beginning in 1915 reversed the favorable price-cost relationship, since the price of gold remained fixed. This created an unfavorable climate for gold investments until 1934, when the official price of gold was increased (dollar devalued) to $35 an ounce. The higher price provided profit incentives for gold mining until 1942, when War Production Board Order L-208 closed U.S. gold mines during World War II. This order was rescinded in 1945, but many mines did not reopen. Many of those that did reopen were forced out of business by 1962–1963 due to high post-war inflation which pushed mining costs up while gold's price remained fixed. A major exception was the Homestake mine, which, except for the three-year government closure, has operated continuously since 1877. Other important exceptions include the Carlin and Cortez discoveries in Nevada which were placed in production in the 1960s because of relatively low operating costs attributable to bulk mining by open-pit methods. Overall, however, the investment climate for gold mining remained unfavorable from 1943 until early 1974, two and one half years after the U.S. abandoned the fixed dollar value of gold.

Mine operating costs rising with price of gold

The free-market value of gold provided strong profit incentives for investment, when, in January 1974, the price reached $140 an ounce, establishing parity with the purchasing power of a depreciated U.S. currency. Since 1978, the incentives have been even greater because gold prices have exceeded U.S. currency depreciation for the first time in our history. In summary, favorable gold investment climates existed from 1792 to 1915, 1934 to 1943, and from 1974 to the present. unfavorable climates persisted from 1915 to 1974, with the exception of the period 1934–1943. Although the gold price has risen substantially, operating costs for the gold mining business have also increased. The average free world cost of production of gold is estimated at $215 an ounce as of Dec. 31, 1980.

Exploration technology improvements finally applied to gold

Major advances in exploration technology that have been achieved in the last 35 years were not generally applied to gold because of the unfavorable investment climate that persisted. These advances include new geologic concepts, geologic models, and improved exploration methods, which have been used successfully in the search for porphyry copper, molybdenum, lead/zinc, uranium, and for other mineral deposits. With an improved investment climate, these advances can now be applied with great advantage in gold exploration programs.

Other factors further enhance prospects for profitable gold investment in the United States. New types of gold deposits, such as at Carlin, have been recognized and provide new exploration targets. Improved processing methods, such as heap leaching and carbon-in-pulp recovery methods, may also provide lower operating costs and therefore improve the economic potential of some new projects.

Price a measure of gold's purchasing power

The dollar price of gold is the measure of gold's purchasing power in the United States. Judgments concerning future dollar values of gold are germane considerations when assessing profit incentives to justify investments in exploration, development and mining of gold.

One approach to estimating gold's purchasing power in the United States is referred to as the "commodity value." This approach assumes that gold is simply a commodity and that its U.S. purchasing power is a function of the value of the dollar, as measured by an index such as the Consumer Price Index. Based on this index (with 1967 = 100), the U.S. "commodity" value of gold should be $275 an ounce, the current CPI (fig. 1).

Other values come into play when considering purchasing power since gold represents wealth and can be used as a reserve in support of paper currencies and government debt. Another method, therefore, of estimating the dollar value of gold can be conveniently termed the "U.S. monetary value," implying the U.S. purchasing power of gold is related to such economic variables as the U.S. money supply, federal debt,

balance-of-payments deficit, etc. These "monetary values" of gold can be calculated by dividing the quantity of each by the gold reserves held in the Treasury. These values will obviously change almost daily as the Federal Reserve and Treasury positions change.

Assuming only a 25 percent backing by gold reserves, the current "money supply (M1B) value of gold" would be $407 an ounce; the "federal debt value," $923; and the "U.S. balance-of-payments deficit value," $207 as given below:

U S Treasury gold supply	....	264.2 million oz	
		$/oz gold	
		25% reserve	100% reserve
Federal debt*	$976 billion	$923	$3,694
Money supply (M1B)	$430 billion	$407	$1,627
U S foreign balance of payments deficit ..	$219 billion	$207	$ 829
Money Supply + U S BOPD	$649 billion	$614	$2,456

*as of Sept. 1, 1981

If these monetary values were to require 100 percent gold reserve backing, gold prices in U.S. dollars for each category would be four times greater.

During the last nine years the base gold price has exceeded the "U.S. balance-of-payments deficit value" of gold, assuming the deficit is backed by a 25 percent gold reserve. On the other hand, the highest free-market price for gold ($850 an ounce), achieved in 1980, correlates to the "U.S. balance-of-payments deficit value" of $829, assuming backing by a 100 percent gold reserve. At 25 percent coverage, the "federal debt value" of gold of $923 per ounce somewhat exceeds the highest free-market price for gold attained to date.

If, as some economists assume, a minimum responsible gold coverage would be a 25 percent backing for outstanding money supply (M1B) plus our balance-of-payments deficit, the current purchasing power of gold in the U.S. would be about $614 an ounce. Should confidence in the U.S. dollar totally collapse, the 100 percent backing for the money supply and balance-of-payments deficit value of gold alone would approximate $2450 an ounce. Similar considerations apply to various U.S. government commitments and guarantees, which substantially exceed the official federal debt of $976 billion as of Sept. 1, 1981. Of course, similar calculations for the purchasing power of gold for other countries would result in different values, based on their reserves and monetary liabilities, so that gold values continually vary from currency to currency.

Return to gold standard under discussion

Another financial indicator for the purchasing power of gold might be a comparison of the price performance of gold and of the stock market in the United States (fig. 3). Historically, the stock market has established a long-term growth rate, increasing at approximately 3 percent a year. Gold prices in dollars per ounce were higher than stock market averages from 1792 to 1830, overlapped the market from 1830 to 1890, were lower than the market from 1890 to 1980, and, finally, briefly overlapped the market in the spring of 1980.

These methods of estimating the purchasing pow of gold are not just an abstract economic exerc Since precious metal mining is a very capital intens industry, we at Homestake use these types of ana ses, and others, to arrive at our estimate for the fu purchasing power of gold. We have found the outl sufficiently optimistic to commit a substantial inv ment in gold exploration, development and minin

Recently, economic discussions have keyed on possibility of returning to the gold standard to cure country's economic ills. The U.S. Federal Rese defines the "gold standard" as the commitment establish a fixed relationship between currency an specified amount of gold. By this definition, the U has been on the "gold standard" for 160 of the last years. The country experienced relatively stable pr for the first 123 years of its history. The long-te trend lines for inflation rates averaged 0.2 percen year from 1792 until 1915. This stability changed matically beginning in 1915, with inflation increas at an average rate of 3.3 percent a year for the 66 ye from 1915 to 1981. This dramatic change in infla rates took place when the country was on the g standard, which, according to proponents of g standard as a cure for inflation, should not h happened. The gold standard, clearly, did not prev this major long-range change in the rate of inflat Why should a return to the gold standard cure in tion in the 1980s?

One immediate and obvious association with inflation rates commencing in 1915 is World War I the years of war and cold war since then. While w and the cost of wars, certainly have contribute inflation and to actions resulting in inflationary fed policies, it appears that the policies themselves are cause of persistent long-term inflation. What gove ment policies coincided with World War II that c continue to cause inflation?

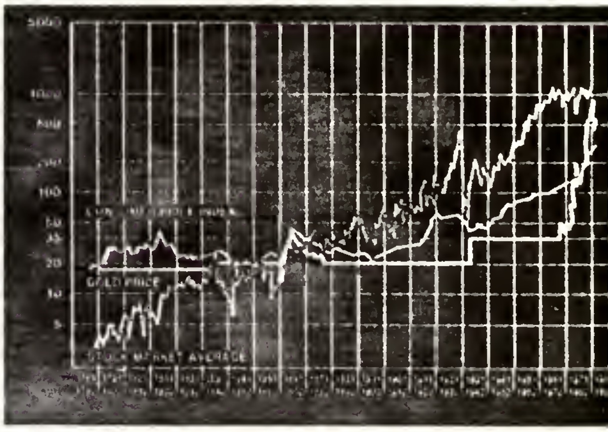


Fig. 3. Price performance of gold and stock market averages

To consider this question, it is enlightening to ex ine the events surrounding the major increase in rate of inflation commencing in 1915.

Historical evidence suggests that long-term infla rates respond to major governmental policies actions that cannot be prevented by a gold stand One of the actions was the creation of the Fed Reserve System in 1914, which marked the beginn of permanent, accelerating federal debt, increasin an average long-term rate of 7.0 percent a year

tween 1914 and 1981. Economists agree that excessive government spending, creating federal deficits, results in inordinate demands for goods and consequently forces increases in prices for those goods. Another government policy that directly influenced inflationary pressures was that of federal taxation of personal and corporate income initiated in 1913. This taxation results in higher prices for products, services and labor to maintain investment returns and income at acceptable levels. Nonetheless, the rate of taxation has increased steadily since the inception of taxation. These two government policies clearly influence rates of inflation—influences that would not be prevented by reestablishment of a gold standard.

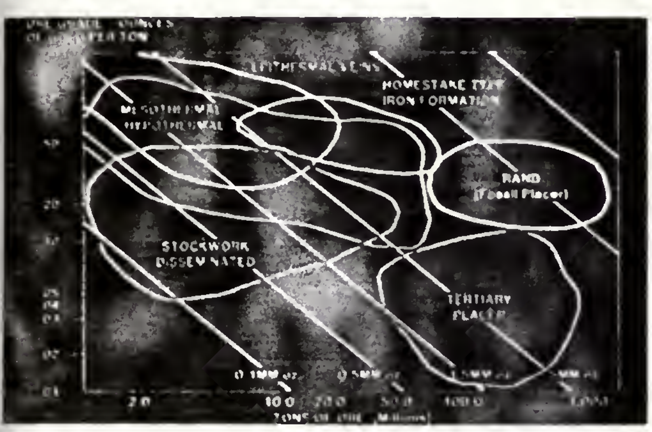


Fig. 4 Types of major world gold deposits

The initial maximum tax rate was 7 percent, without distinction between capital gains and earned income. By 1981, the top tax rate on personal earned income was 50 percent, unearned income, 70 percent; and corporate income, 48 percent. U.S. individual and corporate income tax rates have increased at a rate of 3.4 and 4.2 percent a year, respectively, since 1913. Actual federal income taxes collected have increased at a rate of 6.5 percent a year since 1913. U.S. history has shown that the gold standard does not prevent or cure inflation. Responsible government monetary and fiscal policies and actions, together with minimum government regulation of a free-market system, are required to insure stability of the economy and prices. The free-market price for gold does, however, appear to be a thermometer that reflects the success of the government's efforts to control or cure inflation.

New growth plan set by Homestake in 1978

Homestake's long-term historical business emphasis and commitment to profitable gold exploration, development and mining were reinforced during the development of a new corporate growth plan in 1978. Our optimistic estimates of the long-term future purchasing power of gold, new profit incentives, combined with significant geological and technological advances in exploration and processing opportunities justified accelerating our exploration program to capitalize on Homestake's existing expertise in a timely manner.

A number of criteria were considered in formulating our U.S. gold exploration objectives. Included among them are:

1) Consideration of size and economic parameters;
2) Geology and geologic types of world gold deposits;
3) Appropriate levels of exploration efforts;
4) Budgeting and scheduling of an effective exploration program;
5) Projected exploration risks and rewards.

Homestake's corporate plan emphasizes maintaining and strengthening its position as the premier U.S. gold mining company. We therefore concentrated our efforts toward discovery of large deposits that would substantially enhance our U.S. gold production and earnings. The major objectives of the exploration program were to discover:

1) Gold reserves containing 3 million oz (a major deposit) within ten years;
2) Gold reserves containing 1.5 million oz (a substantial deposit) within five years;
3) Gold reserves containing a minimum of 0.5 million oz (an acceptable deposit discovered by "fall-out" from the search for larger reserves).

Internal rate of return considerations (minimum of 15 percent) require that we find relatively low-cost mines (in the lower half of the cost curve) and relatively high-grade deposits suitable for bulk surface or underground mining. For open pit mining, our objectives focus on deposits with ore grades exceeding 0.15 oz per ton; for underground mining, grades exceeding 0.3 oz per ton.

Geologic types of gold deposits studied

Homestake geologists studied major world gold deposits, classifying the known deposits according to their geology, size and grade, and from this data they determined the desirability of each for our exploration programs in the United States. The geological types of major gold deposits identified in the study are depicted in fig. 4.

The contour lines on fig. 4 represent total contained ounces of gold in a deposit and provide a quick reference to the overall size and importance of each geologic type of gold deposit. The largest gold deposits of the world are the Witwatersrand type Fossil Placer Deposits of South Africa, which contain grades ranging from 0.10 to 0.50 oz per ton, with ore tonnages ranging from 100 million to over 1 billion tons.

After studying the economics, size and grade objectives and the geological occurrences of the various gold deposits likely to occur in the United States, it was decided to search for Homestake-type and Stockwork-disseminated deposits. We also decided to conduct geologic research to develop new geologic concepts that would lead to the discovery of new types of gold deposits of substantial size and grade to meet our corporate objectives.

Exploration success examined empirically

The next step was to formulate the exploration program and determine the extent of the exploration effort in terms of budget and manpower. To accomplish this, we analyzed cost data and probability factors for each of the recognized sequential stages of mineral development. The stages include reconnaissance, target exploration, deposit development, plant construction/mine development and production.

The costs of each activity within each stage of exploration and development were estimated from

Homestake's exploration experience and records. In order to determine probable success ratios to apply to a gold exploration program, it was decided to use the empirical approach based on prior experience. Published and privately developed data on the success ratios of metal exploration programs in the United States and Canada from 1880 to 1976, representing a wide range of success ratios, were compiled (table 1).

	AMC Survey of 41 Large Mining Companies (6 Years, 1970–75)		Private Survey of 9 Major Firms (Pre-1958 Thru 1966)		OTA Survey of 12 Major Firms (10 Years, 1970–76)	
	Number	%	Number	%	Number	%
Reconnaisance	5,718		732		?	
Target Exploration (Drilling Project)	536		185		451	
Deposit Development	83	15	19	12	32	8
Substantial Economic Deposit	?		3	2	19	4

% = % of targets advancing beyond drilling stage

Table 1. U.S. metal exploration success rates

	50% CERTAINTY			75% CERTAINTY		
	Contained Ounces Gold			Contained Ounces Gold		
	500,000	1,500,000	3,000,000	500,000	1,500,000	3,000,000
	Number of Targets			Number of Targets		
Reconnaissance Examinations	56	280	560	100	500	1,000
Target Evaluations	8	40	80	10	50	100
Ore Target Evaluations	2	10	20	2	10	20
Deposit Development	1	1	1	1	1	1

Table 2. Gold exploration probability levels

Probability analyses were then conducted on the data to provide the statistical framework to develop Homestake's empirical probability models for the number of activities that would be required in each exploration stage to accomplish the discovery of an economic deposit of a given size. The results of two such analyses are summarized in table 2.

Once the probability model for a given size of deposit was available, the cost estimates for each exploration activity were used to determine the cost of exploration programs for a wide range of probabilities for a given deposit size (table 3). For example, we estimated it would cost $30 million to search for and find a deposit that would produce 150,000 ounces of gold a year for ten years; that was for a probability of 75 percent. To put that figure in perspective, we estimated it would cost $22 million for a 50 percent probability of success, and $16 million for a 30 percent probability of success.

It is important to note that for a given budget expenditure, exploring for a single metal, such as gold, has a higher probability of success of a discovery than does the probability of finding gold in a multi-metal search with the same budget (fig. 5). It follows that similar studies be conducted to develop exploration programs for each metal in a proposed multi-metal search effort. The timing of exploration expenditures must also be considered, both from the standpoint of the resources of the exploring company, availability of qualified personnel, and the competitive situati

Formulation of Homestake's exploration pr included all of the above factors in determining i gold exploration program. Projected probab costs and timing of the company's exploratio gram are summarized in fig. 6 and table 4. graphics show that substantial expenditures m made to test a large number of targets to achie high probability of success in gold exploration th desired. Homestake's projected gold explorati penditures and projected returns (i.e., risk r ratio), based on achieving the five-year program tives, are summarized in fig. 8.

Exploration team reorganized to manage by function

To take maximum advantage of the compan house expertise to achieve the major objectives new growth plan, the exploration team was r nized in November 1978 to manage by expl function rather than by geographic location. Th

Ten-Year Production (Million Oz)	Certainty Level		
	75%	50%	30%
.5	$ 7	$ 6	$ 5
1.5	$30	$22	$16
3.0	$42	$36	$31
6.0	$78	$65	$57

All Production From One Pr

Table 3. Gold exploration program budget

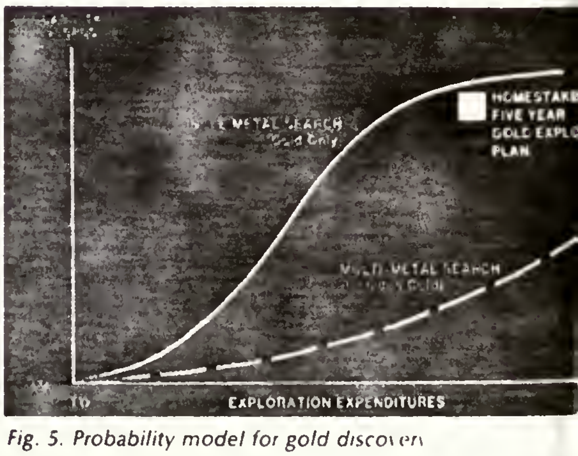
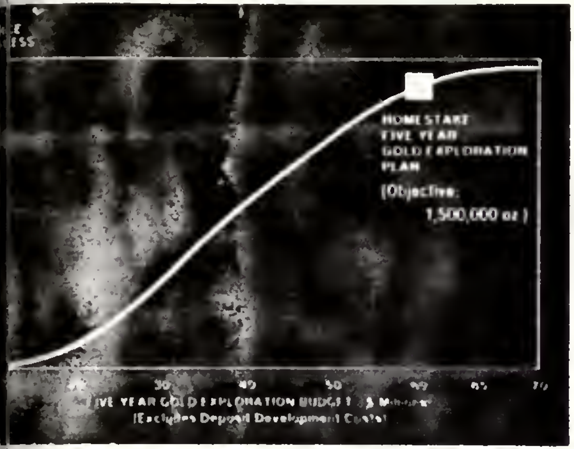
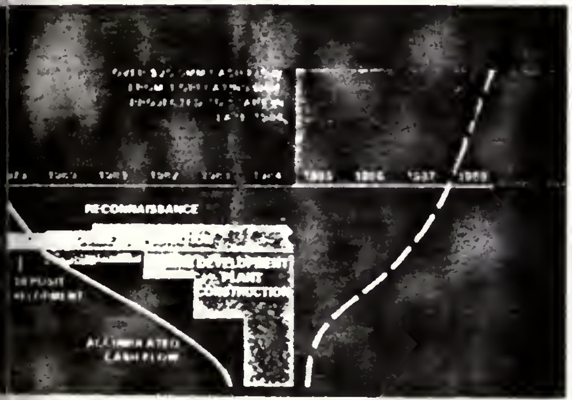


Fig. 5. Probability model for gold discovery



old exploration budget



imated gold expenditure and income—five year plan

nctional exploration activities include reconnais- target exploration, deposit development, and cquisition administration. The managers of ctivities are responsible for developing plans idgets, quality and quantity standards, pro- and organization to achieve the desired results r functional areas, regardless of the geographic n. For instance:

he gold reconnaissance manager is responsible r the search and selection of favorable areas, etailed appraisals of favorable areas, and the lection and prioritization of a queue of target eas, as well as land acquisition to control target nds. High priority targets are transferred to the rget evaluation manager for further evaluation. sser priority properties are retained in a queue r future consideration by reconnaissance.

he target exploration manager is responsible for itial exploration testing to evaluate specific tar- t areas. If preliminary results and economic timates are encouraging, this manager is re- ponsible for conducting additional exploration delineate the deposit and to conduct prelimi- ary engineering, metallurgical testing and eco- omic appraisals. High priority properties are ansferred to the deposit development manager. gain, lesser priority properties are retained in a rget queue.

he deposit development manager is responsible r bulk sampling, pilot plant testing, metallurgi- l and engineering appraisals, conceptual mine nd plant design and for preparation of a prelimi- nary feasibility study. High priority properties with acceptable size and economics are transferred to the Homestake operations management for mine development, plant construction and production.

4) The land acquisition-administration manager is responsible for acquiring land control and administering land contracts. This manager provides these services to the other exploration managers in coordination with corporate policy.

Conceptual approach to reconnaissance used

The conceptual approach to reconnaissance has been utilized in place of the more conventional geographical approach. Under this system, reconnaissance teams pursue specific types of gold deposits in any favorable area. Applied geologic research is conducted to: refine geologic models and search areas with potential for well known types of gold deposits; develop geologic models and search areas for poorly known or poorly understood gold deposits; develop theoretical concepts and techniques to search for new types of gold deposits; and improve performance and decision-making at each functional stage of exploration.

Development of a prioritized queue of prospects for each stage of exploration has been an essential element of Homestake's exploration program since this system provides an opportunity to identify "fast-track" high priority projects, leaving lower priority prospects in an inventory classification for future consideration.

Priority ratings are assigned to properties by estimating the geologic probability of occurrence of commercial gold deposits which conform to the objective of the exploration program. Criteria used to make these priority evaluations include: a) the presence of a geologic trap (favorable structural setting or favorable permeable host rock), b) evidence of a gold source (presence of ore grade or anomalous gold values, or in some cases, pathfinder elements), and c) the presence of favorable alteration systems (alteration assemblage

	Number of Projects Strategic Objectives	
	5-year plan	10-year plan
Reconnaissance		
• Reconnaissance Exams	2000	4000
• Detailed Evaluations	200	400
Target Exploration		
• Target Evaluations	65	130
• Ore Target Evaluations	16	32
Resource Development		
• Deposit Inventory	8	16
• Deposit Development	4	8
Mine Discoveries		
• Economic (0.5 million oz.)	3	6
• Substantial (1.5 million oz.)	1	2
• Major (3 million oz.)	0	1
Exploration Expenditures		
• 5-year plan: $60 million		

Table 4. Exploration probability statistics—U.S gold program. Homestake Mining Co

Table 5. Exploration statistics—U.S. gold program, Homestake Mining Co.

	Number of Projects 1979–1981 Program	
	Plan to Date	Results to Date
Reconnaissance		
• Reconnaissance Exams	1011	1111
• Detailed Evaluations	58	55
Target Exploration		
• Target Evaluations	17	14
• Ore Target Evaluations	2	3
Resource Development		
• Deposit Inventory	3	3
• Deposit Development	0	0
Mine Discoveries		
• Economic (0.5 million oz.)	0	0
• Substantial (1.5 million oz.)	0	0
• Major (3 million oz.)	0	1

Exploration Expenditures to Date (2.5 years): $28 million

related to a geological model for a given type of gold deposit).

After the geologic probability assessment for each prospect is estimated, the cost of arriving at the next decision point for each prospect is determined. Risk factors and present value estimates are then determined for each property and a priority established. By updating priorities at each decision point for a project, we are able to continuously prioritize projects at all stages of the exploration sequence.

During the first year of exploration under this system, Homestake emphasized the development of a reconnaissance queue of prospects. At the end of the first year, we had identified enough high-priority properties to begin our target exploration programs. Target evaluation during the second year generated a deposit development project and also resulted in identification of several targets requiring intensified target evaluation efforts. Deposit development continued on a high-priority project during the third year. In addition, we continued fine-tuning of our reconnaissance, target exploration and management systems.

Payoff came within first two years of program

Homestake has been fortunate early in its exploration program to realize the soundness of the theoretical concepts. The company discovered and began development of a major discovery within the first two years of the exploration program. This compares quite favorably with our hopes and expectations.

The McLaughlin gold deposit, located in a remote area of northern Napa County, Calif. near Knoxville, was discovered during the second year of our exploration program. This deposit contains announced reserves of 20 million tons at 0.16 oz of gold per ton and is obviously a major addition to Homestake's gold reserve portfolio. This discovery achieved two of our exploration program goals:

1) The deposit meets the objective of our ten-year program, i.e., the discovery of an ore deposit containing 3 million oz in gold reserves.
2) Discovery of a new geologic type of gold deposit, using new geological models and concepts.

The McLaughlin deposit may best be described as a Stockwork gold deposit in volcanic and sedimentary rock, suitable for open pit mining. In addition, we foresee the possibility for an underground mine operation on higher-grade gold ore below the estimated pit limits. The cost to discover and develop the McLaughlin property, together with establishing a queue of more than 60 properties in various stages of evaluation, amounts to $28 million to date, or approximately $9 per ounce of announced gold reserves at the McLaughlin deposit.

An analysis of published open pit gold reserves in 19 deposits in the United States illustrates that a large number of deposits have been discovered, expanded and resurrected during the last five years. U.S. open pit-type gold reserves as of Sept. 1, 1981 are estimated at 242 million tons of ore at a grade of 0.076 oz of gold per ton or 18.5 million oz of gold. Grades range from 0.03 to 0.22 oz of gold per ton, with tonnages ranging from 1 million to 65 million. The average deposit is estimated to contain 12.7 million tons of ore at 0.076 oz of gold per ton, or approximately 1 million oz of gold.

Success was partly luck

The profit potential for gold mining investments due to the free-market prices of the last decade—after nearly 65 years of adverse fixed-price, high-inflation margin squeezes—has provided new incentives for gold exploration, development and mining.

Major advances in exploration technology that have been developed and successfully used in other metals and minerals exploration since World War II have not been intensively applied to gold exploration because of the adverse investment climate for gold. To take advantage of these new economic and technological incentives, Homestake developed its current exploration strategy and objectives in 1978.

A major exploration program based on new geologic concepts, probability analyses, and a functional approach to exploration management was implemented in 1979. The objectives included discovery of a major 3.0-million-oz gold deposit within ten years and a 1.5-million-oz deposit within five years. Our board of directors committed to an exploration budget of approximately $12 million a year for five years, a major commitment for Homestake at a time when corporate earnings were at $31 million a year (1978). This was a daring commitment, but the board expressed its confidence—in dollars and cents—in the expertise Homestake had developed in exploring, developing and mining for gold during its 100 years as the nation's largest gold producer.

The program met with early success in the fall of 1980 with the discovery of the 3.2-million-oz McLaughlin gold deposit in California. The deposit has been named after Dr. Donald H. McLaughlin, the 89-year-old retired chairman (and still a director) of Homestake Mining Co. It was McLaughlin, who, as a geologist in the 1920s, played a key role in expanding the known gold reserves at the Homestake mine in South Dakota. The McLaughlin discovery has to be attributed to the efforts of a fine, dedicated professional exploration team. It achieved at the end of the second year Homestake's ten-year exploration program goal. This, we admit, was partly luck but also a result of Homestake's excellent and extensive geological files which aided in rapid development of new geologic concepts.

The long-term commitment to new exploration ideas and approaches by Homestake's executive management and directors has provided excellent support for our exploration efforts. Our early success and our ongoing search for new deposits will keep the company in the forefront of gold production and expertise in the United States for years to come.

James A. Anderson is currently executive vice president of exploration and business development for Homestake Mining Co. which he joined in 1975. Previously he was with Occidental Minerals Corp. from 1968 to 1975, lastly as vice president of U.S. exploration, and Kennecott Copper Corp. from 1960 to 1968, initially as a research geologist and later as an exploration geologist. He has an MS in geological engineering and a PhD in economic geology.

APPENDIX B

WILL BAKER

Homestake

April 18, 1984

Editor—A few days ago the Yolo County Planning Commission granted permits which will allow the Homestake Company to begin full-scale operaiton of its massive McLaughlin Mine. Winning these permits was an impressive, if not unprecedented achievement, and in this letter I wish to highlight some of the more remarkable successes of the Homestake team.

Consider these obstacles.

1. Soon after the company announced its plans to dig the biggest hole in California behind Blue Ridge, a small group of malcontents discovered and broadcast the news that Homestake had been cited twice by the EPA as one of the "superfund" polluters—firms responsible for the worst toxic dumps in the nation. In addition, Homestake had a recent record of extensive litigation over its failure to meet water quality standards in South Dakota.

2. Then, after many assurances that this modern, progressive mining corporation had left such sordid matters far behind, and even as local authorities perused the just-printed Environmental Report for the McLaughlin pit, it was learned that thirty-four families in Milan, New Mexico, had just filed lawsuits totalling 194 million, charging groundwater pollution from a Homestake uranium mine.

3. Meanwhile, the Environmental Impact Report, though based entirely on Homestake's samples and data, was running into heavy criticism from the Bureau of Reclamation, the EPA, Solano Irrigation District, Bay Area Air Quality Control, and the state Department of Conservation. Some Homestake estimates were held to be inaccurate by as much as a factor of ten. So the company flew in new experts, took more samples, and after minor adjustments the EIR was certified.

4. A scant few months later, another group of angry citizens launched a multi-million dollar suit because their wells were contaminated by wastes from McClellan Air Force Base. Engineering Sciences, the firm that did the EIR for McClellan (a study labeled "poor" and "inadequate" by the U.S. General Accounting Office) was the very same firm that did the McLaughlin EIR.

5. In Yolo County Homestake's main problem was to secure approval for a dam and reservoir. They needed water to mill the ore and wash away the cyanide waste. The site of this reservoir, however, was reserved for agricultural use according to the terms of a contract under the Williamson Act. This law, in strong and unambiguous language, discouraged the conversion of ag land to industrial purposes.

Worse, the band of troublemakers previously mentioned, mostly impoverished and asocial farmers from the Northern Capay Valley, rallied around the Williamson Act and threatened to submit the reservoir proposal to a public referendum, thus appealing to the final, sacred authority: THE PEOPLE.

Such a battery of difficulties would seem insurmountable, but Homestake's "environmental" team began to work their slow, sure, inexorable magic. They smiled. They shook hands. They brought colorful charts, slide shows, and booklets. They spoke softly, clearly, and humbly about their commitment to jobs, safety, public schools, scientific research, flood control, a favorable balance of payments, and the tule elk. Tactfully, they also mentioned the showers of tax dollars that the giant mine would bring.

Yolo County listened. A "zoning ordinance amendment" was fabricated to handle that troublesome Williamson Act. The new amendment allowed an owner to convert ag land into a privately-owned reservoir for mining purposes—even though the county's lawyer said himself that the act "disfavored" such conversions. The malcontents bellowed at this hypocrisy, chiming that amendments were supposed to improve laws, not cancel them. Homestake rejoined smoothly that their reservoir—perhaps in twenty-five years, maybe in a century—would provide flood control and improved wildlife habitat. The malcontents were apoplectic. In the case of a 20-foot rise in Cache Creek, they said, the reservoir would reduce the flood by a whopping two and one-half inches; and the idea that a mile-long strip mine would delight the deer and quail was too ridiculous to warrant intelligent rebuttal.

Homestake smiled and flew the county supervisors over the mine site, explaining again how very sincere they were in wanting this wonderful project to move ahead. The malcontents considered starting a petition to place the whole reservoir issue before the voters. They had been told (explicitly in a memo from the Planning Commission) that the new amendment would not be effective until 30 days after a formal second reading of the text. But no second reading was ever scheduled.

The supervisors published a two-week notice in the paper, counting from the first reading. The malcontents hit the streets anyway and in just 12 days gathered 3,500 signatures for a referendum. They needed another thousand and asked for a two week extension, pointing out that the county had announced a second reading and had guaranteed them 30 days.

The county smiled and said they were sorry, but no. Homestake smiled too, and well they might. It was a stunning achievement. They had persuaded Yolo County's government to overlook its own error, to ignore its citizens, to avoid sounding the public mind, in fact to plan and supervise for the benefit of special interests, without regard for the people's will. In one stroke they gained their reservoir, established themselves as a political power second to none in this country, and changed the course of law.

They also taught us a vital lesson. The lesson is: Gold is God. Gold can hire men and women to enact laws, to reinterpret them, to ignore them. Gold can persuade us of almost any point of view: that strangers who come from San Francisco to blast huge holes in our back yard are our good neighbors; that such blasting makes things better for little wild creatures; that thousands of tons of deadly poison can enter an area without "significant" risk; that all this noise and dust and danger is important business that advances civilization toward some high destiny. It can even—and here is the final miracle—persuade the Sierra Club to be handmaiden to Homestake Mining Corporation, the twice-crowned Superfund Queen.

We would be remiss if we did not signal the rare triumph of Mr. Ray Krause, "Environmental Manager" of the McLaughlin Project. He has effected one of the great coups in the annals of public relations work, and should find himself, once corporate America learns of his efforts, a much-sought and wealthy man. I can think of but one higher challenge to his genius: Could he persuade his client and the Sierra Club to co-sponsor an exhibit at Disneyland? A model of the McLaughlin mine with a statue of John Muir at the brink of the pit, hand raised in benediction? Muir was a loner and a rough-looking old codger, however, so it might be better to garb him in a polyester leisure suit, shave off his beard and blow-dry his hair so he won't frighten the little suburban children. For a religious note, Mr. Krause could suggest that Lake, Napa and Yolo counties contribute (from their new revenues) a little chapel next to the exhibit. They could dedicate the chapel to Gold Almighty, and call it Yesmister Abbey.

WILL BAKER
Rumsey

APPENDIX C

NORMAN BIRDSEY

1984 Homestake Mining, U.S.A.
<u>Ore transport</u>

The 200,000 oz/yr. McLaughlin mine, located north of San Francisco, was commissioned by Homestake in the mid-eighties. At that time, a (environmental) decision was taken to locate the processing plant as close as practical to the tailings pond. As a result of this, ore from the open pit had to be transported over-land a distance of 7 km (4.5 miles). In pit crushing and slurry transport was identified as the most economical and environmentally sound way to proceed.

The initial "ground ore" flow of 275 m^3/h (1210 USgpm), at 50 bar (725 psi), was supplied by 4 GEHO TZPM 180 pumps. In addition, at the processing plant, part of the ore concentrate is handled in an autoclave system. The feed pumps for the autoclaves are required to provide 275 m^3/h at 25 bar (360 psi). The slurry which these pumps are required to handle is $95^{\circ}C$ (200F) and has a pH of 1-3. For this duty GEHO supplied 3 TZPM 150 pumps, in stainless steel execution. In 1988, Homestake commissioned an additional four TZPM 180 pumps, in order to double the capacity of their ore transport system.

GEHO PUMPS®

GEHO INFO

Monthly info-bulletin for sales representatives and distributors
Volume 3, No. 2, March 1993

Autoclave feed pumps in the gold industry

This article describes briefly certain gold recovery methods used to treat both oxide and sulfide ores, outlines the pre-treatment of refractory sulphide ores by means of pressure oxidation (in an autoclave vessel), and finally, describes the specialized pumping equipment used to feed the autoclaves.

Oxide ores

Gold is commonly recovered from oxide ores in two ways: for lower grade ore by means of a heap leach operation, and higher grade ore through an oxide mill operation.
Heap leaching is a straight forward process. The mine ore is crushed to a specified size fraction. Cementatious material and water are added in order to agglomerate the material. This material is then stacked onto a leach pad, where it is sprayed with a cyanide solution, which leaches out the gold as it percolates through the heap. The gold bearing pregnant solution is sent to the mill, where it is absorbed by activated carbon. The gold bearing carbon is then stripped in a similar manner as mill carbon.

An oxide mill recovers gold from the ore by crushing and grinding it to a specified size fraction. The ore is then processed through either of a number of available processes, such as carbon-in-leach (CIL), cyanide leach, and carbon-in-pulp (CIP), depending on certain characteristics of the ore. After CIL, the carbon is pressure stripped of the gold. The gold bearing solution is then pumped through an electrowhinning cell, then further refined into bullion.

Refractory sulphide ores

While a certain percentage of gold is recoverable from refractory ores by conventional cyanidation, a pre-treatment step is required in order to yield a greater recovery rate. A now commonly used pre-treatment process is pressure oxidation, also known as autoclaving.

Pressure oxidation (autoclaving) is a process which transforms the sulphide ore into an oxide ore, which makes it more amenable to cyanide extraction. The process is usually performed after ore grinding.

The autoclave, essentially a large pressure cooker, drastically reduces the time to minutes, what nature takes millions of years to do.

Referring to figure #1, acidic gold slurry is taken from a thickener into a series of splash heating towers, in order to raise its temperature up to as much as 175°C 350°F. The hot acidic slurry is then fed into the autoclave with a positive displacement piston diaphragm pump.

During its approximate hour in the autoclave, the slurry is agitated and mixed with oxygen and steam. This enables the sulphides in the ore to become oxidized, which in turn exposes the fine particles, and readies them for cyanidation. The slurry then enters a series of flash cooling towers, in order to dissipate the pressure. This process releases steam, which is returned to the splash heating towers, thus rendering the system more efficient. The final flash cooling tower cools the slurry before it enters a conventional milling process.

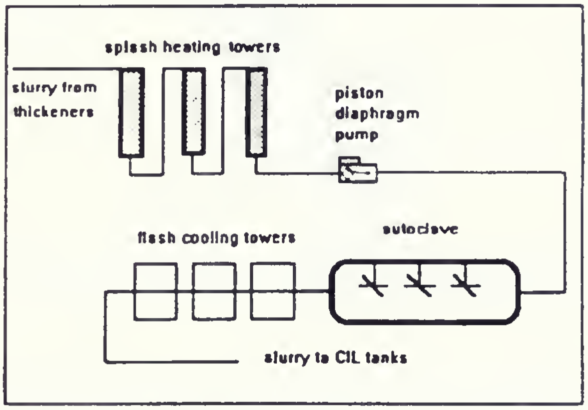


Figure 1: Pressure oxidation

Autoclave feed pumps

The reason that a piston diaphragm pump is used is because of the extremely harsh slurry characteristics:
- high temperature, to 175°C/350°F
- acidity, pH as low as 1
- high abrasion, Miller # to 150
- high pressures, to 38 bar/550 psi
- flow rates to 120 m^3/h / 525 gpm per pump

The GEHO piston diaphragm pump is ideally suited for feeding the high temperature autoclaves. The *liquid end* of the standard piston diaphragm pump (suitable for slurry temperatures to 100°C/212°F) is shown in fig.2, and comprises of the following features:

- Unique preformed diaphragm, which separates the aggressive slurry from the major pump running components, such as pistons, cylinder liners, etc.
- PLC monitored and controlled stroke control system, operational at both suction and dis charge stokes which ensures optimal diaphragm life.
- Cone type suction and discharge valves.
- High and stable pump efficiencies as high as 95%.
- Guaranteed pump availability of 98 %.

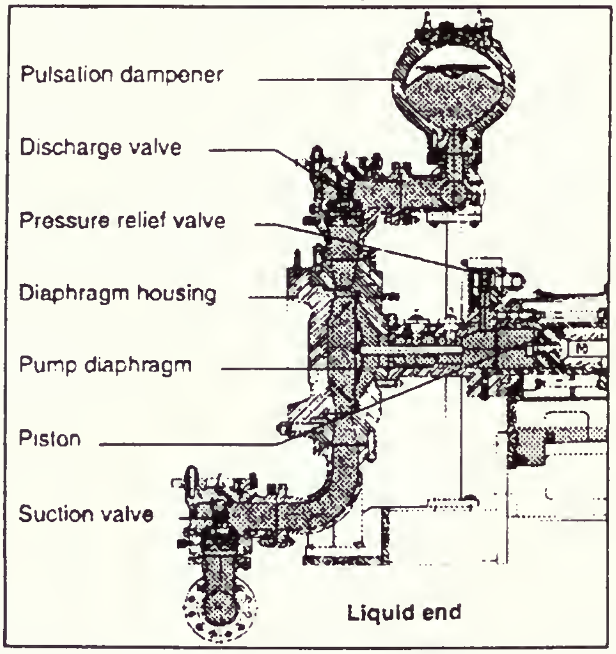


Figure 2: Liquid end of GEHO diaphragm pump.

For the high temperature autoclaves, GEHO has developed a special high temperature diaphragm pump, capable of pumping the hot, acidic and corrosive slurry. Figure #3 depicts such pump.

As shown in Figure #3, a *drop leg* is fitted between the diaphragm housing and the slurry valves.

A cooling jacket surrounds the drop leg, and serves to cool the hot slurry to a certain temperature that is within the thermal limits of the diaphragm material. This ensures long life between diaphragm maintenance changes. At the same time however, the temperature of the slurry fed to the autoclave is not affected by this cooling action.

As a result of the acidic nature of the slurry, duplex

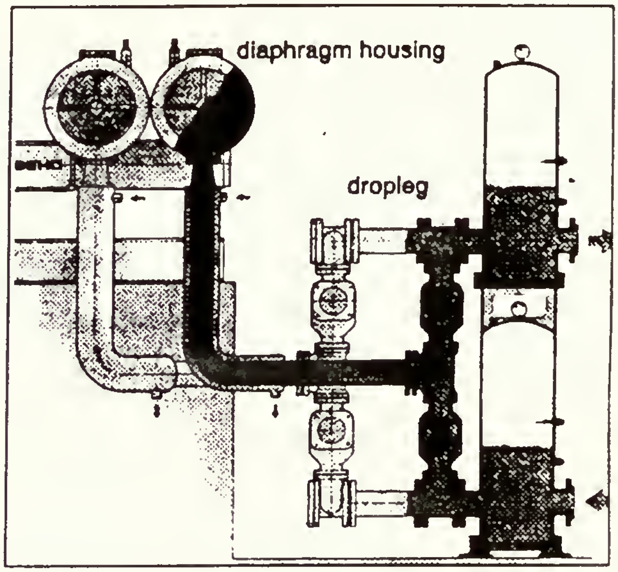


Figure 3: Dropleg design.

stainless steel is used for the wet end pump components, that are in contact with the slurry, such as valves, drop leg, diaphragm housing, etc.

Since the first 3 GEHO piston diaphragm autoclave feed pumps were installed in 1984 at Homestake Mining Company's McLaughlin Mine, located in California, there have been 27 more autoclave pumps selected for various mines such as:

- American Barrick's Mercur Mine, Utah: 1 pump, temp=175°C/350°F, pH=7, pres=36 bar/525 psi
- First Miss Gold's Getchell Mine, Nevada: 3 pumps, temp=175°C/350°F, pH=1, pres=38 bar/550 psi
- American Barrick's Goldstrike Mine, Nevada: 12 pumps, temp=175°C/350°F, pH=1, pres=32 bar/480 psi
- Placer Dome's Porgera Mine, Papua New Guinea: 6 pumps, temp=49°C/120°F, pH=4, pres=20 bar/290 psi
- Sao Bento Mineracao, Brasil: 3 pumps, temp=75°C/167°F, pH=4, pres=20 bar/290 psi
- Lone Tree Mining, Nevada: 2 pumps, temp=135°C/275°F, pH=2, pres=19 bar/282 psi.

GEHO PUMPS is recognized as the world leader in autoclave pumping. Experience has shown that the GEHO piston diaphragm pump offers the reliability and pump availability that autoclave mills demand.

APPENDIX D

BRICE BLEDSOE

"Environmental Stewardship"

OBSERVATIONS OF CONTAINMENT AND CONTROL FOR POTENTIAL WATER QUALITY MODIFICATIONS FROM THE HOMESTAKE MINING COMPANY McLAUGHLIN MINE AND MILL

Prepared for:

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April, 1994

Project No. 34-0048

GEOCHEM

A Division Of TERRA VAC
Subsurface Remediation Specialists

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1.0 CONCLUSIONS

On April 14, 1994, Mr. Jim V. Rouse, Principal Geohydrologist of GEOCHEM Division, Terra Vac (GEOCHEM) conducted his annual data review and field evaluation at the Homestake Mining Company (HMC) McLaughlin operation, located in the Hunting and Knoxville Creek basins of California. Based on these efforts, and on the data made available, Mr. Rouse concludes that:

1. As a whole, the HMC McLaughlin operation is operating as designed and is in compliance with water quality permits. The HMC operation presents no threat to the quality of Solano Irrigation District (SID) waters.

2. The tailings containment facility is operating as designed, with no release of water or tailings to the environment. As a result, there has been no detectable impact on downstream water quality, no change in quality of the ground water, and no threat to the quality of SID waters. The tailings containment facility is further enhanced by favorable geochemical conditions in surrounding soils, which provide yet another level of protection to ground and surface waters.

3. The waste rock disposal operations, as modified over the past years, are operating as designed with the successful implementation of additional containment facilities. The modifications to waste rock disposal practices have had beneficial effects. Water quality in the receiving waters remains within limits defined in the baseline studies, and as such, presents no threat to the quality of SID waters.

2.0 INTRODUCTION

2.1 Background

Homestake Mining Company currently operates a major open-pit gold mine and associated mill in the Hunting and Knoxville Creek drainage basins, north of Lake Berryessa, California. Lake Berryessa is operated by the Solano Irrigation District, for storage of irrigation water. HMC and SID have entered into a program which provides for binding arbitration, if necessary, to evaluate the water quality in Lake Berryessa and its tributaries as a result of HMC's activities. This arbitration agreement calls for the joint selection of a "water quality expert" suitable to both HMC and SID. Mr. Jim V. Rouse has been selected as this "water quality expert." A copy of Mr. Rouse's resume is attached as Appendix 1. Mr. Rouse is charged with the conduct of periodic site visits to review water quality, data collection and monitoring activities. He has visited the site to observe such activities in December, 1986 and April of 1988 through 1994. The annual field inspection has as its purpose:

1. observation of HMC monitoring activities and their appropriateness,

2. independent collection of water quality samples for a separate, third party review, and

3. review of existing water quality and compliance with permits.

2.2 1994 Inspection Purpose

As noted previously, Mr. Rouse has conducted annual reviews of HMC operations since 1986. Table 1 contains comparative data on samples collected by HMC and Mr. Rouse through 1993. Data for 1994 samples are forthcoming. The purpose of the 1994 inspection was to:

1. evaluate conditions, as documented by stream monitoring,

2. conduct a preliminary review of 1993 and 1994 water quality data collected by HMC, and

3. conduct a stream conductivity profile in an area of observed conductivity increase. This profile compliments similar profiles which have been conducted over past years.

2.3 General Conclusions

Based on the reviews described in Section 2.2, it is concluded that:

1. The McLaughlin mine and mill is operating in accord with existing permits and agreements. The technical exceedances to permit criteria reported during the winter of 1993 resulted from excessive precipitation events, and did not impact water quality in Hunting Creek, the receiving water.

2. The progressive reclamation of the waste rock is proceeding in accordance with approved reclamation plans, and is having positive effects on water quality.

3. Surface and ground water monitoring is being conducted in accordance with the approved monitoring plans, and yields data of high quality.

4. The McLaughlin project is operating as designed and permitted, and poses no threat to the quality of SID waters.

3.0 TAILINGS CONTAINMENT FACILITY

Operation of the McLaughlin mill yields a somewhat unique tailings, since the processing involves oxidation of sulfide-bearing ore minerals prior to processing and discharge into the tailings containment facility. The tailings containment facility was designed as an earth fill impoundment to retain the oxidized tailings and associated tailings liquor. The tailings impoundment facility was intentionally situated on an area of low permeability bedrock, with favorable geochemical conditions. In addition, the oxidized tailings have favorable geochemical conditions to fix and immobilize heavy metals.

Based on the field inspection and the review of the data made available to Mr. Rouse, together with the past reviews in the period 1986 to the present, the tailings containment facility is operating as a zero discharge facility, as designed, and in accordance with existing permits. To the best of Mr. Rouse's knowledge, all required monitoring has been conducted, and the results have indicated no anomalous data. Downstream water quality conditions, as documented by surface and ground water monitoring and observations along the tributary to Hunting Creek tailings basin, indicate no impact on water quality. The tributary, at the time of Mr. Rouse's visit, was flowing clear, with algal growth in the stream, as a result of low flow conditions.

The McLaughlin tailings impoundment is an exemplary tailings facility, and is adequately protecting both ground and surface water resources by the containment of tailings and associated tailings liquor.

4.0 WASTE ROCK CONTAINMENT OPERATIONS

Open pit mining at the McLaughlin mine yields variable quality waste rock, some of which has high sulfide concentrations which have the potential for sulfide oxidation and the generation of high sulfate concentrations. Partly as a result of Mr. Rouse's prior site inspections, the waste rock disposal practices were upgraded to assure that sulfide oxidation products would be minimized and controlled. Based on Mr. Rouse's 1994 inspection, and the review of past data, the waste rock containment operations, as practiced, are exemplary in nature and are operating as designed and in accordance with applicable permits.

January through February, 1993, was a period of exceptionally heavy and prolonged rainfall at the McLaughlin operation. As a result of this exceptional rainfall, the volume of underdrain flow exceeded the capacity of the then-installed pump back system. The underdrain flow which was in excess of the collection and pump back system capacity subsequently entered a series of sediment control ponds, where it mixed with surface runoff, and subsequently discharged to Hunting Creek. As reported in a March 10, 1993 letter to Mr. Steve Rosenbaum, of the California Regional Water Control Board, from Ms. Dolora M. Koontz, there were two technical exceedances noted on January 7, 1993. These exceedances include the incremental pH increase between receiving water stations, and the total suspended solids value in station 003. Three technical exceedances were noted during monitoring on January 20, 1993. These include effluent total suspended solids (TSS) levels, together with concentrations for mercury and zinc. Effluent concentrations, although slightly elevated, were negligible in comparison to receiving stream conditions, with no impact observed in Hunting Creek as a result of the discharge. Despite this lack of impact, Homestake initiated a program to immediately upgrade the capacity of the pumpback system to prevent further occurrences. In addition, improved interception of underdrain flows, through the installation of engineered upgrades to the underdrain system, was completed in 1993.

During his earlier annual inspection reports, Mr. Rouse noted that the water type in Hunting Creek had been changing to a preponderance of sulfate over carbonate and bicarbonate, as a result of the increased waste rock disposal in Hunting Creek drainage basin. Mr. Rouse suggested modifications to the waste rock disposal system, which were subsequently implemented, which led to a decrease in the sulfate yield of the area. The question of sulfate loading increase was anticipated in the project Environmental Impact Report/Environmental Impact Statement (EIR/EIS) and supporting documents, as submitted to and approved by the California Regional Water Quality

Control Board. The question of sulfate levels in the discharge were further addressed in a March 18, 1994 letter to Mr. Mike Johnson of the California Regional Water Quality Control Board, Central Valley Region, from Ms. Koontz. She noted that the waste rock disposal facility has been modified to implement best available technology to minimize the impact of waste rock leachate, utilizing a program of encapsulation of acid generating waste rock. The encapsulation is designed to eliminate oxygen and water penetration of the sulfate-generating waste rock.

The sulfate loading associated with the waste rock was anticipated in the permitting of the operation, and, based on the historic database, has had no impact on SID waters. Such loading should decrease as a result of planned final closure of the waste rock disposal facility and subsequent flushing of the underdrain system.

As will be discussed in a following section, there have been visual improvements to Hunting Creek, in the area of downstream monitoring station HC-10, as a result of the modifications to the waste rock disposal operations. In the past, there was some iron staining of concrete in the area of the HC-10 flow monitoring facility, but the staining has significantly reduced over the past years.

In conclusion, it is obvious from the field inspection and data review that the management practices implemented at the waste rock disposal facilities have been effective in controlling potential contamination from waste rock disposal activities.

5.0 1994 FIELD OBSERVATIONS

On April 14, 1994, Mr. Jim V. Rouse accompanied Mr. Tom Milligan of HMC on his routine water-quality sampling in the Hunting and Knoxville Creek drainage basins. Table 2 provides field data collected by Mr. Milligan, utilizing HMC field pH, conductivity, and dissolved oxygen meters.

As in the case of the 1993 sampling observations, Mr. Milligan collected and preserved these samples in accord with standard field techniques, which should yield representative water quality samples. Field sample filtration was accomplished in the field by means of a Geofilter™ pressure-filtration apparatus, utilizing disposable 0.45 micron QED™ high flow filters. The Geofilter™ equipment utilization was initially recommended by Mr. Rouse, and was implemented in 1990. Such equipment significantly reduces the contamination potential associated with sample field filtration. Mr. Milligan's field techniques were appropriate for collection of the water quality samples.

The weather during the April 14, 1994 site visit was clear, with stream flow significantly reduced from 1993 conditions.

As a result of the low rainfall conditions, stream flow in Hunting Creek at Station HC-11, upgradient of Homestake mining operations, was minimal, with flow occurring through the rocks of the stream bed.

Station HC-9 is located on a tributary to Hunting Creek, immediately downgradient of the tailings disposal area. Stream flow was minimal, with water occurring as standing pools in the stream bed. This condition was reflected by the relatively low dissolved oxygen content in the sample.

Station HC-5 is located on Hunting Creek immediately upstream of the waste-rock disposal area. Flow in the creek was clear, primarily through rocks of the alluvial stream bed. Dissolved oxygen content was high due to aeration as the flow moved between the rocks.

When sampling at Station HC-10, downgradient of the waste rock disposal area, both Mr. Milligan and Mr. Rouse collected additional blind duplicate samples for intralaboratory quality control purposes. The flow was reported at 204 gallons per minute, which is significantly less than in

previous years. Mr. Rouse noted that there was less iron staining on the concrete of the flow control structure at this station than in previous years. Such reduction in staining is a direct measure of the effectiveness of the waste rock disposal operations.

Flow in Knoxville Creek at Station KC-3 was a mere trickle, estimated at 3 to 5 gallons per minute. The water was clear, with minor amount of algae present in the stream. As anticipated, the conductivity at this station was relatively high, as a result of the presence of natural mineral springs a short distance upstream of the sampling point.

6.0 STREAM PROFILE

In evaluating the 1994 field data, it was noted that the conductivity of Hunting Creek showed a significant downstream increase, from a value of 650 micromhos per centimeter at Station HC-5 to 900 micromhos per centimeter at Station HC-10. This increase was consistent with past years' observations. In past years, Mr. Rouse and various Homestake personnel have conducted a number of stream conductivity profiles which have identified the source of the salinity increase as ground water discharge into Hunting Creek between Station HC-5 and the upstream-most underdrain collection pond. As a result of this past observation, Homestake has installed a collection and pumpback system for containment of seepage along a small tributary draining from the waste rock disposal area into Hunting Creek. Appendix 2 is a memorandum prepared by Mr. Rouse documenting observations during the 1994 stream profile. Mr. Rouse's conclusions are that the seepage collection and pumpback system has been effective at reducing the subsurface flow into Hunting Creek. The minor amount of saline ground water which seeps into Hunting Creek is in a relatively localized area of the stream.

7.0 SUMMARY

Based on the 1994 review, the tailings and waste rock disposal facilities are operating as planned and constructed, and as such provide adequate containment for potential environmental contaminants. The past HMC monitoring and the independent monitoring conducted by Mr. Rouse have shown that such containment is protective of the waters of Hunting Creek. The fact that the monitoring documented the trend change in water quality type in Station HC-10, which led to the modification of the waste rock disposal practices, is proof that the monitoring program is effective in protecting surface and ground water. Reclamation of the waste rock disposal area is proceeding as planned, and is having beneficial impacts.

It is recommended that HMC continue to operate and monitor as in the past. Such operations and monitoring will provide adequate and appropriate protection for waters of the Solano Irrigation District.

APPENDIX E

GENERAL McLAUGHLIN MINE INFORMATION

April 7, 1877.]

MINING AND SCIENTIFIC PRESS.

The Manhattan Quicksilver Mine.

The Lower Lake *Bulletin* says: This splendid quicksilver mine is located in the northern extreme end of Napa county, a little over one mile and a half from the Redington or Knoxville mine, in a northwesterly direction, and is owned by Messrs. Knox & Osborne, the original discoverers and locators of the Redington, now one of the most complete in machinery and appurtenances on the Pacific coast. The Manhattan has but one furnace, of the Knox & Osborne patent, the capacity of which is 20 tons of ore in 24 hours. Sixty hands are employed, and are worked by shifts of 30 men each, which alternate every ten hours. The owners expend about $2,500 per month, and the mine produces from 18 to 25 flasks of silver per week. The value of works and personal property is estimated at about $500,000, and, with the mine included, at $1,000,000. The owners have been offered the above sum frequently, but have as frequently refused to sell. Mr. J. M. C. Walker, the Superintendent, is a miner of large experience and an expert withal. Having but one furnace for coarse ores, the Superintendent had to devise means to reduce the fine ores, and the way he does it is novel and original with him. Instead of making adobes and drying them, as other miners do, he does just the opposite. The coarse and the fine are never separated—all the ore is piled together, and then water is thrown upon it until it is sufficiently wet for the fine ore to stick to the coarse. In this condition it is put into the furnace. One might suppose that more sulphuric acid would be formed by this process, but it is not the case—the formation in which the cinnabar is found is mostly lime rock and entirely destitute of sulphur. The company own about 3,000 acres of pasture and farming lands and a large number of fine stock.

The engineers appointed to examine the suspension bridge, Niagara Falls, report it entirely safe.

courtesy of
Gray Brechin

USEFUL INFORMATION.

White House Whitewash.

The *American Manufacturer* publishes the recipe for the whitewash used on the east end of the Presidential mansion—the White House: Take one-half bushel of nice unslacked lime, slack it with boiling water; cover it during the process to keep in the steam. Strain the liquor through a fine sieve or strainer, and add to it a peck of salt, previously well dissolved in warm water; three pounds of ground rice, boiled to a thin paste; one-half pound of powdered Spanish whiting, and one pound of clean glue, which has been previously dissolved by soaking it well, and then hang it over a slow fire in a small kettle within a larger one filled with water. Add five gallons of hot water to the mixture, stir it well, and let it stand a few days covered from dust. It should be put on hot, and for this purpose it can be kept in a kettle on a portable furnace. It is said that about a pint of this mixture will cover a square yard upon the outside of a house, if properly applied. Fine or coarse brushes may be used, according to the neatness of the job required. It answers as well as oil paint for wood, brick, or stone, and is cheaper. It retains its brilliancy for many years. There is nothing of the kind that will compare with it, either for inside or outside walls. Buildings covered with it will take a much longer time to burn than if they were painted with oil paint. Coloring matter may be put in and made of any shade desired. Spanish brown will make reddish pink when stirred in, more or less deep according to quantity. A delicate tinge of this is very pretty for inside walls. Finely pulverized common clay, well mixed with Spanish brown, makes a reddish stone color; yellow ocher stirred in makes yellow wash, but chrome goes farther, and makes a color generally esteemed prettier. It is difficult to make rules, because tastes are different; it would be best to try experiments on a shingle and let it dry. Green must not be mixed with lime; it destroys the color, and the color has an effect on the whitewash which makes it crack and peel.

THE COMMON SALT GLAZE.—To the purest accident are many of the utilizations of common substances due. One of the producing causes of prosperity of the Staffordshire pottery manufacture was the discovery of a cheap, durable glaze. The discovery was due purely to accident. At Stanley Farm, a few miles from Burslem, a maid servant was one day heating a strong solution of common salt, to be used in curing pork. During her absence from the kitchen, the liquid boiled over. Being in an unglazed earthen vessel, the solution, spreading over the outside, produced a chemical action which she little understood, and which did not compensate her for the scolding she received. Some of the elements of the liquid combined with those of the highly heated brown clay surface to produce a vitreous coating, or enamel, which did not peel off when the vessel was cold. The humble brownware vessel acquired historical celebrity. A Burslem potter, learning what had taken place, saw that glazed-ware might possibly hit the taste of the public; he introduced the system of glazing by means of common salt, a system at once cheap, easy and durable; and England has made many a million pounds sterling by the accidental discovery.

ASBESTOS PAPER.—*La France Nouvelle* gives the following account of the manufacture of an incombustible paper from asbestos. The new paper costs four francs per kilogramme. The paper mills are in the city of Tivoli, where Victoria made his successful attempt to manufacture this paper, which is specially adapted for valuable documents, etc. It has recently undergone most conclusive tests by the Marquis de Bariera, at an exhibition of objects made of this substance, now being held in the Corso at Rome. Two card-board boxes containing papers, one made of ordinary material and the other of asbestos, were thrown into the fire. The former was entirely consumed, while the latter remained intact, together with the papers it contained. The most useful employment that has been made of this substance up to the present has been the manufacturing of it into theatrical hangings. This is an excellent use of it, and it is evident that if what is said of it be true, its sphere of usefulness is likely to be greatly extended.

TESTING PETROLEUM.—In a recent lecture in regard to testing safe and dangerous oil, Dr. Chandler showed some interesting experiments. Some oil was placed in an open tester and gradually heated on a water bath with a thermometer. It was found to flash, or give off combustible vapors, at about 110° Fah.; and it burned at 118°, being what is called very safe oil. He then placed some of this same oil in a closed vessel resembling a metal lamp, but provided with a cork instead of the common head or burner, and having electric wires attached. On heating the oil to 85°, and sending a spark through the vapors, an explosion took place which blew out the cork with a loud report, showing that oil which has been considered safe gives out explosive vapor at ordinary summer heat.

PAVEMENT BLOCKS FROM SLAG.—A new process of casting and annealing paving blocks of furnace cinder, says the *Iron Age*, has been suggested, which is claimed to furnish a good and uniform material that resists wear and gives a good footing for horses. This process consists in taking the slag as it flows from the furnace and running it into molds placed upon a circular table. As fast as the molds are filled, they are moved away, and left to cool down to a dull red color. The molds are then opened, and the blocks are taken out and annealed in a furnace kept at a particular temperature for 24 hours. They are then finished, and may be used at once. The chief novelty of this process seems to be the annealing of the blocks of slag.

PATINA.—An imitation of patina for bronze objects of all kinds can be produced, according to the *Ind. Blatter*, by preparing a paint of carbonate of copper and any light alcoholic varnish, and applying it to the object with a brush. This green color penetrates the smallest recesses, and has, when dry, the appearance of patina. Carbonate of copper gives a blue patina, verdigris a light green, and intermediate shades of color can be obtained by mixing the two.

TO KEEP TOOLS CLEAN.—When tools are clean and bright, they may be kept so by wiping, before putting them away, with a cloth dipped in melted paraffine. If they are rusted they may be cleaned by soaking in kerosene oil, and then rubbing with an oily rag dipped in fine emery powder.

TO MAKE ROPES DURABLE.—To prolong the duration of ropes and retard their decay, steep them in a solution of sulphate of copper, an ounce to a quart of water, and then either tar them or immerse them in soapsuds, four ounces of soap per quart of water. In the latter case there is no smell.

GOOD HEALTH.

Croup.

Croup is an inflammation of the inner surface of the windpipe. Inflammation implies heat, and that heat must be subdued or the patient will invariably die. If prompt efforts are made to cool the parts in case of an attack of croup, relief will be as prompt as it is surprising and delightful. All know that cold applied to a hot skin cools it, but all do not as well know and understand, that hot water applied to an inflamed skin will as certainly cool it off. Hence the application of ice-cold water with linen cloths, or of almost boiling water with woolen flannel, are very efficient in the cure of croup. Take two or three pieces of woolen flannel of two folds large enough to cover the whole throat and upper part of the chest, put these in a pan of water as hot as the hand can bear, and keep it thus hot by adding water from a boiling tea-kettle at hand; let two of the flannels be in the hot water all the time and one on the throat all the time with a dry flannel covering the wet one, so as to keep the steam in to some extent; the flannels should not be so wet when put on as to dribble the water; for it is important to keep the clothing as dry as possible, and the body and feet of the child comfortable and warm. As soon as one flannel gets a little cool put on another hot one, with as little interval of exposure as possible, and keep up this process until the doctor comes, or until the phlegm is loose, the child easier, and begins to fall asleep; then gently wrap a dry flannel over the wet one which is on, so as to cover it up thoroughly, and the child is saved. When it wakes up both flannels will be dry. The same result will follow if cold water is used, the colder the better; the cloths should be of muslin or linen and of several folds thickness, large enough to cover the whole throat and the upper part of the breast.—*Idem.*

APPENDIX E2
from California Journal of Mines and Geology, State Mineralogist's Report XLI, April 1945 (41:2)

trend of the regional geology. Like the other faults in the district they are interpreted as thrust faults along which there was a small amount of horizontal movement. The Knoxville and Jericho Creek faults are arcuate, trending nearly north in the southern part of the district, and nearly west in the northwestern part. The serpentine mass between these faults apparently overrides the northwest-trending faults that terminate against the Knoxville fault in sec. 17, T. 11 N., R. 4 W.; sec. 1, T. 11 N., R. 5 W.; and secs. 27 and 36, T. 12 N., R. 5 W.; but whether this is the case or not could not be determined by field evidence.

Viewed as a whole the district exhibits two very distinct structural trends, both of which blend into the arcuate pattern of the Knoxville and Jericho Creek faults. The major trend is indicated by the southern end of the Knoxville fault, the fault at the Harrison mine, the fault at the Reed mine, and the strike of the Knoxville strata in the eastern part of the district, all of which trend a few degrees west of north. The minor trend is seen in the parallelism of the several cross faults that break the Knoxville fault, and the northwestern end of the Knoxville fault, all of which strike a few degrees north of west.

Two of the minor cross faults that break the Knoxville fault occur at the Knoxville mine where there is a change in the trend of the Knoxville fault. Here the mineralized zone is confined to a small block between these faults. Apparently this block has been rotated approximately 45° on a north-northwest-trending horizontal axis, the upper half moving differentially west and the lower half moving differentially east. In any event, the serpentine-Knoxville contact in the mine workings dips to the east at 45°, whereas, a few hundred feet south of the south cross fault the contact has been proven by drilling to be nearly vertical, and other evidence shows that it dips steeply to the west farther south along the trace of the Knoxville fault.

QUICKSILVER DEPOSITS

Most of the quicksilver deposits in the Knoxville district are confined to silica-carbonate rock along the northwest-trending faults. In the Manhattan mine, the only exception to this generalization, the ore occurs in volcanic rocks. Cinnabar (HgS) is by far the most important ore mineral. In the early days of mining, however, the black mercury sulphide, metacinnabar, was found in considerable quantities in the upper levels of both the Knoxville and the Reed mines. Native mercury has been observed as fine globules lining cavities in several mines. It is most abundant in the Red Elephant mine, but nowhere does it constitute more than a small fraction of the ore. Gangue material other than the silica-carbonate rock is mostly pyrite and marcasite (FeS_2), calcite ($CaCO_3$), dolomite CaMg $(CO_3)_2$, and certain liquid and solid hydrocarbons, including curtisite, which has been noted in considerable quantities in the Knoxville mine. The cinnabar is later in occurrence than any of the other minerals with the exception of part of the carbonates and all of the hydrocarbons, which were deposited in the final stages of mineralization.

Several rare minerals occur in the district. Redingtonite, a hydrous chromium sulphate, was discovered in the Knoxville mine, and this is its only known occurrence. Millerite (NiS) has been reported in microscopic quantities, and tests of the pyrite show traces of gold. In sheltered places ... silica-carbonate rock which normally are stained red or brown by iron oxide, locally exhibit crusts of yellow iron sulphates.

In all of the mines except the Manhattan, the ore occurs as discontinuous veins and irregular masses of cinnabar contained for the most part in minute fracture systems in, or near, silica-carbonate rock. The silica-carbonate rock, which has been described in earlier pages of this report, is serpentine that has been replaced by silica and carbonates in hot solutions. In the Knoxville, Harrison, and Reed mines the solutions moved upward along fault contacts between serpentine and Knoxville sediments, replacing the serpentine in a narrow belt. Heavy clay gouge zones formed by the movement along the faults made effective barriers that prevented the dissipation of the solutions through the adjoining sediments. Shortly after its formation the silica-carbonate rock was fractured slightly by minor movements along the faults, and mercury-bearing solutions, rising during the last phase of hydrothermal activity, permeated these fractures and deposited cinnabar. In general, the ore is more abundant in the silica-carbonate rock at the gouge contacts where the solutions were concentrated, but some ore occurs within the gouge zones as well.

Mineral deposition was controlled by local changes in the dip and strike of the gouge zones. In the Reed mine, particularly, where the contact between silica-carbonate rock and gouge is in most places nearly vertical, the ore shoots occur under hanging walls of gouge produced by local reversals in dip. This is illustrated in the cross-sections on Plate XII. In general, the ore shoots are small in all dimensions, but several have been mined continuously for vertical distances of more than 150 feet.

In the volcanic rocks of the Manhattan mine the ore occurs primarily along joint cracks in both basalt and tuff, and occasionally along bedding planes in tuff.

The grade of ore in the district has dropped steadily during the many years of mining operations, and the average yield from the operating mines during 1943 was between 5 and 10 pounds of mercury per ton.

MINES AND PROSPECTS

Quicksilver has been obtained from six mining properties in the Knoxville district, which are discussed below in the following order: Knoxville, Manhattan, Harrison, Soda Springs, Reed, and Red Elephant. In addition, certain pertinent data are given for each in tables 1 and 2. Several isolated quicksilver occurrences that have been prospected without success are also discussed. Most of these properties have had a long mining history during which the general interpretations of the geology have changed with each new phase of development, and appraisals of ore reserves have varied with the price of quicksilver. During this time no systematic geologic observations were planned to keep pace with developments, and although the region was visited at intervals by geologists and mining engineers, no one person has ever had anything approaching a comprehensive view of the underground geology because workings usually cave within a short time after they are abandoned. As early as 1888 Becker[14] wrote concerning the Knoxville mine, "At the

[14] Becker, George F., Geology of the quicksilver deposits of the Pacific slope: U. S. Geol. Survey Mon. 13, p. 281, 1888.

time of my visit (1883) . . . the greater part of the workings were entirely inaccessible.'' The summary descriptions that have been published by the California Division of Mines[15] are therefore of great value in that they record the results of observations by several individuals at various times in places where observations can no longer be made.

Knoxville Mine

The Knoxville mine, owned and operated by George E. Gamble, is in secs. 6 and 7, T. 11 N., R. 4 W., M. D., in the northern part of Napa County. Under various owners the property has also been known as the Excelsior, Redington, and Boston mine. By the end of 1943 it had produced more than 121,000 flasks of quicksilver, approximately 80 percent of the total for the district. This record is exceeded by only three mines in the State of California. Production at the Knoxville mine began in 1862, following the discovery of cinnabar in a newly opened road cut, and increased to a peak in 1876 and '77. During succeeding years the quantity and grade of ore gradually declined, and the mine was abandoned, and reopened several times. Some production, however, has been recorded for most of the years of its long life (see table 1). The mine was abandoned late in 1941 after extensive exploration for ore on the old 90, 150, and 210 levels had proved unprofitable, but quicksilver was still being produced at the end of 1943 from alluvial

Table 2—Record of mines in the Knoxville district Napa, Yolo, and Lake Counties, California

Mine	Location T. N.	Location R. W.	Location Sec.	Owner	Operator	Length of workings (feet, estimated)	Reduction equipment
Knoxville	11	4	6, 7	G. E. Gamble	G. E. Gamble	15,000	40-ton rotary
Manhattan	11 11 12	4 5 5	6 1 36	R. B. Knox	Charles Wilson and W. M. Hickox		1-tube retort
Harrison	12	5	26 35	Verne and Vince Harrison	H. C. Scott		30-ton rotary
Soda Springs	12	5	36	Verne and Vince Harrison	H. C. Scott		
Reed	12	5	23 24 25 26	Bradley Mining Company	Bradley Mining Company		13-ton rotary (abandoned) 40-ton rotary
Red Elephant	11	5	3	Z. Gradine	Red Elephant Mines, Inc., H. D. Tudor, Pres.		

[15] Forstner, Wm., The quicksilver resources of California: California Min. Bur. Bull. 27, pp. 76-79, 81-89, 117, 1903.
Bradley, W. W., Quicksilver resources of California: California Min. Bur. Bull. 78, pp. 62, 82-83, 86-87, 204-205, 1918.
Ransome, A. L., and Kellogg, J. L., Quicksilver resources of California: California Div. Mines Rept. 35, no. 4, pp. 395, 409-411, 476, 1939.

placer material, from weathered and slumped surface debris near the outcrop of the mineralized zone, and in limited amounts from old dumps.

The mine lies on the Knoxville thrust fault, which brings serpentine in contact with Knoxville strata. Two east-trending cross faults, which probably were produced by the change in trend of the Knoxville fault at this point, break the continuity of the Knoxville fault north and south of the mine, and limit the extent of mineralization. The block between these two cross faults apparently was rotated approximately 45° on a north-northwest-trending horizontal axis during compression, the upper half moving differentially to the west. In any event, the serpentine-Knoxville contact dips east at an angle of 45° in the block, whereas elsewhere it is nearly vertical.

The ore in the Knoxville mine occurs in black silica-carbonate rock that is confined to the Knoxville fault in the zone between the two cross faults, and to a short, narrow belt along the south cross fault. In the upper part of the mine serpentine, gouge, and silica-carbonate rock are irregularly distributed, and in some places several parallel silica-carbonate ''ledges'' occur, each underlying a gouge zone. Lower in the mine, below the 210 level, the mineralized zone is well defined as a single fault and is much narrower than it is above. The contrast between the widths of the mineralized zone in the upper and lower parts of the mine is well illustrated by the map of the mine workings (Pl. IX).

The increase in width upward of the gouge and mineralized zone, from the lower to the upper mine levels, suggests that ore was probably deposited near a surface not far above the present ground surface and possibly under an extension of the nearby lava flows as described by Schuette.[16]

The mineralized zone in the mine has been prospected down to the 600 level (Pl. IX). The ore, however, is said to have contained more pyrite and less cinnabar on the lower levels, and extensive development was carried on only to the 330 level.

Southward, the workings on all levels terminate abruptly along a north-northeast-trending line, and it is obvious that prospecting in this direction was unsuccessful. It is interesting that the south cross fault, which forms the boundary of the mineralized block on the surface, does not coincide with this line. In the absence of any specific surface or underground information bearing on this point it may be assumed that a subordinate northeast-trending fault formed a barrier to ore deposition to the south at the position indicated by the zone of crosscuts near the ends of the workings.

As the extent of mineralization has also been limited by a fault to the north it follows that any further attempts to obtain ore must be made in the lower levels of the mine. The workings below the 210 level, and particularly those below the 330 level, were abandoned many years ago when the price of quicksilver was much lower, and some low-grade ore may still remain in place and in stope fill. It is unlikely, however, that there will be a recurrence at depth of a broad, rich mineralized zone such as existed in the upper levels.

[16] Schuette, C. N., Occurrence of quicksilver orebodies: Am. Inst. Min. Met. Eng.

Manhattan Mine

The Manhattan mining property, which lies on the Lower Lake road one mile northwest of the Knoxville mine, consists of a mineralized area one mile long and several hundred yards wide in Tertiary volcanic rocks. The total recorded production from the property to the end of 1943 is about 8,000 flasks. The amount produced, however, must have been considerably larger because in the early days of mining various individuals in different parts of the mineralized area sold their stocks in different markets. It is believed by some that the total production from the property is of the order of 16,000 flasks[17].

The rocks at the Manhattan mine consist of interbedded Tertiary olivine basalt and tuff overlain in part by hot spring deposits. The flows and tuffs dip 20°-50° SW. away from the crest of the ridge, which lies a short distance northeast of the mineralized area. As stated in the section on volcanic rocks, it is probable that these rocks were deposited on a sloping surface not greatly different from the present surface, although they may have been tilted somewhat by later movements. The fact that the volcanic section comprises at least two flows and two intercalated beds of tuff makes it impossible to show the precise distribution of the two rock types on a small-scale map. In general, however, the ridge top is underlain by basalt, and the lower slopes by tuff as shown on Plate VI.

As seen on the geologic map (Pl. VI) the volcanic rocks at the Manhattan mine are underlain by a fault, which brings the Franciscan formation in contact with Knoxville strata. This fault is exposed only at the north and south ends of the property, but its position under the volcanics is indicated by a small outcrop of serpentine and glaucophane schist in the extreme north-central part of sec. 1, T. 11 N., R. 5 W., and by the distribution of the Franciscan and Knoxville formations outside the area covered by volcanics.

Most of the volcanic rocks in the vicinity of the Manhattan mine have been altered by hydrothermal solutions. The basalt is bleached and partly kaolinized, and the tuff is either similarly altered or silicified. An exception to this generalization is a fine-grained variety of relatively unaltered tuff closely resembling shale, the "mudrock" of the miners, which is exposed near the Johnstown shaft, and at the entrance to the North-End tunnel.

The silicified tuff, which is locally called "opalite," resembles bedded white chart, and usually stands above the surrounding softer rocks. (See Pl. VII). The best exposure of this material is in the San Quentin glory hole near the entrance to the property.

The ore in the Manhattan area occurs as small irregular veins filling joint cracks in the volcanic rocks, and as local areas of disseminated cinnabar in the volcanic rocks adjoining the veins. The most productive veins have been in basalt or silicified tuff, but a few have been worked in the softer, unsilicified tuff where some additional ore occurred along bedding planes. The veins are nearly vertical and at most localities strike N. 10°-30° E. None of them are persistent either in length or depth, and as a result, the surface production has come from many widely distributed open pits.

The most interesting pit is the San Quentin glory hole, which is made up of several interconnected quarries cut into a small hill of silicified tuff. Numerous small parallel vertical veins were mined here by tunnels and stopes that extend short distances laterally from the bottom of the pits, and by shallow shafts sunk in the floor of the pits.

The other pits in the area, all of which are in altered lava or partly silicified tuff, have slumped somewhat since abandonment, and yield little information on the nature of the ore occurrence. The north-northeast-trending pit a short distance north of the San Quentin hill, however, is reported by Forstner [18] to have contained a vein 1 to 4 feet wide and 200 feet long that extended downward 50 to 60 feet in basalt. East-southeast of this pit another vein striking more nearly north was mined by shaft and open cut. The basalt in this pit was 130 feet thick and underlain by tuff. Exploration below the basalt failed to yield any considerable amounts of ore. The most productive pit on the property is said to have been the one immediately south of the Johnstown shaft. Here the ore occurred in both altered basalt and tuff. A shaft was sunk 200 feet near this pit, and according to Forstner [19] penetrated "mudrock" at depth, and ended in lava. No ore was found below the "mudrock", which, presumably, is the same zone that crops out in the nearby creek bottom at the Jamestown shaft.

In the past most of the underground work on the property was concentrated in a zone of interbedded basalt and partly silicified tuff under the basalt-covered ridge northeast of the San Quentin pits. Here the strike of the tuff and of the basalt-tuff contacts is approximately N. 30° W., and the dip is approximately 50° SW. Most of the old stopes were driven along joint planes striking N. 10°-20° E., parallel to the major joint direction on the property, and dipping 75° W. The ore occurs both along the joints and along steeply dipping bedding planes in the tuff. The deepest part of these workings is not more than 200 feet below the surface.

In 1940 and '41 underground development was being carried out in the North-End tunnels at the extreme northern corner of the mineralized area where a basalt dike approximately 50 feet thick has been intruded between serpentine and fine-grained tuff. The dike, which locally thickens to the northwest, dips 45°-55° NE. Silica-carbonate rock and a mineralized zone containing cinnabar mark the contact between the basalt and the underlying serpentine. The presence of serpentine fairly high on the west side of the hill in which the North-End tunnels are driven suggests that the serpentine and the tuff were in fault contact before the intrusion of the basalt dike. Inasmuch as the major fault between the Knoxville formation on the east and serpentine on the west passes beneath this point, the apparent displacement of the tuff can be interpreted as the result of minor movements that occurred during and after volcanic action.

The North-End tunnel area has been thoroughly explored by two adits (see Pls. VI and X). Small amounts of cinnabar have been obtained from small N. 25° E. trending veins in the volcanic rocks and, to a very minor extent, in the serpentine. The basalt-serpentine contact, from which a small amount of ore was recovered, is mineralized with both cinnabar and stibnite (Sb_2S_3).

[17] Ransome, A. L., and Kellogg, J. L., Quicksilver resources of California: California Div. Mines Rept. 35, table 2, p. 360, 1939.

[18] Fostner, Wm., The quicksilver resources of California: California Min. Bur. Bull. 27, p. 86, 1903.

[19] Idem. p. 84.

The ore obtained in this area was burned in a 25-ton rotary furnace that was erected on the east side of the main ridge between the two adits. Approximately 2,500 tons of ore were treated in this operation, but the yield in quicksilver was disappointing and work was abandoned in July 1941. The furnace subsequently was taken out of the district. During the rest of 1941, '42, and '43, random prospecting was carried out by the two lessees, Charles Wilson, and Wm. M. Hickox, who operated a 1-tube retort at the site of the Johnstown shaft.

Although the Manhattan mine has produced a considerable quantity of quicksilver during its history, it is notable that all the ore has occurred in veins of small vertical and horizontal extent. Furthermore, the underground prospecting that has been carried out has, without exception, shown no significant mineralization in the lower part of the volcanic section. If there is any deep-seated mineralization it probably occurs in the Franciscan-Knoxville fault zone that underlies the volcanic rocks, although the fact that quicksilver deposits rarely have a vertical extent of more than a few hundred feet weighs against this possibility. Moreover, the results of operations in this fault zone in the northern part of the property were economically unsuccessful. One unimportant place that has not been explored is the northwestern extension of the Franciscan-Knoxville fault under the basalt cap. As some small production has been obtained in the Harrison mine to the northwest on the same fault, it follows that the area underneath the flow may be favorable ground for exploration although surface indications on the edges of the flow are not encouraging. The best means of exploration and development in this area would be by power shovel, which could be used to cut long prospect trenches normal to the strike of the mineralized joints in the volcanic rocks. A power shovel would also be useful in stripping the hillside between the two North-End adits where a number of small veins were observed.

In a final analysis, the type of development that was being carried out in the area in 1943, in which ore was obtained from small surface cuts, hand sorted, and burned in a retort, is in keeping with the character of the mineralization, and when the price of quicksilver is high, may be expected to yield several flasks per month.

from "Mercury Potential of the United States," U.S. Department of Interior Bureau of Mines,

(1965) 89
Information Circular 8252.

TABLE 19. - Production of mercury in California, 1850-1961

Year	Flasks	Year	Flasks	Year	Flasks
1850	7,773	1888	33,469	1926	5,651
1851	27,962	1889	26,637	1927	5,672
1852	20,132	1890	23,077	1928	6,977
1853	22,431	1891	23,055	1929	10,139
1854	30,201	1892	28,177	1930	11,451
1855	33,217	1893	30,362	1931	13,448
1856	30,197	1894	30,616	1932	5,172
1857	28,390	1895	36,304	1933	3,930
1858	31,204	1896	30,967	1934	7,808
1859	13,086	1897	26,867	1935	9,271
1860	10,066	1898	31,297	1936	8,693
1861	35,230	1899	29,647	1937	9,743
1862	42,276	1900	26,490	1938	12,277
1863	40,798	1901	26,896	1939	11,127
1864	47,801	1902	29,163	1940	18,629
1865	53,349	1903	30,727	1941	25,714
1866	46,856	1904	29,073	1942	29,906
1867	47,309	1905	24,311	1943	33,612
1868	48,042	1906	20,043	1944	28,052
1869	34,033	1907	17,202	1945	21,199
1870	30,275	1908	16,760	1946	17,782
1871	31,894	1909	15,866	1947	17,165
1872	31,829	1910	16,985	1948	11,188
1873	27,824	1911	18,612	1949	4,493
1874	27,939	1912	20,254	1950	3,850
1875	50,581	1913	15,386	1951	4,282
1876	73,194	1914	11,154	1952	7,241
1877	79,917	1915	14,095	1953	9,290
1878	64,300	1916	20,768	1954	11,262
1879	74,169	1917	23,623	1955	9,875
1880	60,320	1918	22,366	1956	9,017
1881	61,251	1919	15,005	1957	16,511
1882	53,029	1920	9,719	1958	22,365
1883	47,032	1921	3,015	1959	17,100
1884	32,123	1922	3,360	1960	18,764
1885	32,284	1923	5,375	1961	18,688
1886	30,178	1924	7,861		
1867	33,983	1925	7,514	Total	2,772,117

PHYSICAL FEATURES

The general topography of the mineral-bearing areas varies from gentle sea-level slopes to rugged terrain exceeding 4,000 feet in elevation. The larger mines are accessible by good State and county roads. Many of the smaller prospects and abandoned properties can be reached only by poor roads and trails. Electric transmission lines extend to most of the principal producing properties; however, some of the large mines and smaller operators depend on locally generated power. Water supplies are adequate from local sources. Timber is trucked from nearby towns or local sawmills.

MERCURY MINING DISTRICTS

The mercury mining districts in California are shown in figure 7. The principal deposits with significant production occur within the Coast Range along a southeast-trending belt extending from Clear Lake on the north to Santa Barbara on the south. This belt is about 400 miles long and up to 75 miles wide.

Mining districts in the Coast Range contributing a major production are as follows:

District:	County
Clear Lake	Lake
Wilbur Springs	Lake, Colusa
Knoxville	Lake, Napa, Yolo
East Mayacmas	Lake, Napa
West Mayacmas	Sonoma
Guerneville	Do.
Oakville	Napa, Sonoma
Sulphur Springs Mountain (Vallejo)	Solano
Mount Diablo	Contra Costa
Emerald Lake (Redwood City)	San Mateo
New Almaden	Santa Clara
Stayton	Merced, San Benito, Santa Clara
Central San Benito (Panoche)	San Benito, Fresno
New Idria	San Benito, Fresno
Parkfield	Kings, Monterey
Cambria-Oceanic	San Luis Obispo
Adelaide	Do.
Rinconada	Do.
Cachuma	Santa Barbara
Los Prietos (Gibraltar)	Do.

Manhattan Mine

The Manhattan mine is in Napa County, about 20 miles southeast of Lower Lake, at an altitude of 2,000 feet.

Cinnabar was discovered in the area during the 1860's and the mine operated during 1862-93 and 1895-1905. Since then operations have been intermittent, and only a few hundred flasks of mercury have been produced. Much of the mine's production was included with the output of other properties in the district, but production estimates are a little over 16,000 flasks.

Rocks in the area consist of interbedded basalt and tuff overlain by hot springs deposits and underlain by a northwest-trending fault. Cinnabar occurs in small irregular veins filling joint cracks in the volcanic rocks, as local disseminations in the wall rock adjacent to the veins, and along a fault zone between altered basalt and serpentine.

Mine workings are extensive and include several small and large open pits, a glory hole, shallow shaft, and numerous drifts and crosscuts.

APPENDIX E4

from Engineering & Mining Journal, December 1987.

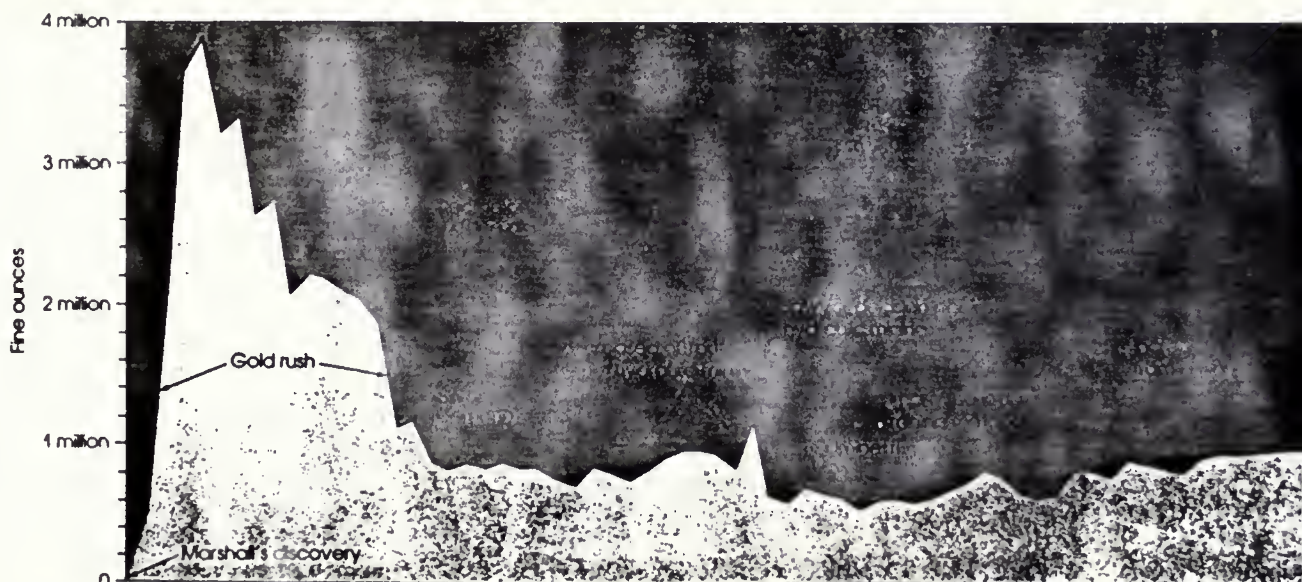
THE NEW CALIFORNIA GOLD RUSH

George O. Argall, Jr., Consulting Editor

Some California gold locations and operators

1. Asamera Minerals
2. Bently Resources
3. Brush Creek
4. Chemgold
5. Cactus Gold
6. Castle Mountain
7. Centurion Minerals
8. Colosseum Gold
9. Eastmaque Gold
10. Grandview Mining
11. Silver State
12. Glamis Gold
13. Gold Fields Mining
14. Homestake
15. Mintek Resources
16. Mother Lode
17. Royal Gold
18. Panosoni Energy
19. Sonora Gold
20. Terramar Resources
21. Vanderbilt Gold
22. Viceroy Exploration
23. Yuba Goldfield

Gold production in California, 1848-1990



California, the Golden state, is experiencing a new gold rush, perhaps not so spectacular as the rush of 1849 but impressive nevertheless. From 1980 through 1987, California gold output multiplied more than 100 fold, spiraling upward from 4,100 oz to 450,000 oz/yr. In 1980, California was the ninth largest US gold producing state. By 1985, it had climbed to second place, behind rich and spectacular Nevada but surpassing the former second place producer, South Dakota.

Gold mineralization is widespread in California. From Pacific beaches to the Nevada state line and from the Oregon border to the Mexican frontier, gold has been mined commercially in 47 California counties. Gold has even been mined in what is now Los Angeles.

California gold is found in many geological environments. Largest and best known are the quartz veins in the slates and greenstones of the Mother Lode. Others include the hot springs deposit of the McLaughlin mine, breccia zones and pipes, and shear zones and veins in granites and granodiorites.

The largest concentration of California gold mines is in the Mother Lode country, encompassing three parallel, roughly north-south striking mineralized zones: the East Belt, the main Mother Lode, and the West Belt. Many mines have been developed in each belt. During the Depression years of the 1930s, an estimated 3,000 separate mining operations produced gold on the Mother Lode and provided jobs for thousands of men who had no other way to make a living.

James Marshall discovered gold in the tail race at Sutter's saw mill on the American river on January 24, 1848. California and the American West have not been the same since. In 1852, California produced 3,932,631 oz of gold, a peak that remains unsurpassed. Production slipped over the years to less the 500,000 oz in 1929 and 1930 but rose gradually thereafter to a second peak of 1,455,671 oz in 1940.

The next stage of decline nearly wiped out the California gold industry, and in 1971, production fell to a rock-bottom 2,966 oz. Accurate figures for the 1970s are hard to obtain, because most mining was being done by individuals and small partnerships that sold the gold to markets other than the US mint.

Gold production in California actually predated Marshall's discovery. From 1775 to 1780, there was some small-scale production in what is now Imperial county in the southeastern corner of the state. Interestingly, these discoveries included gold in the Cargo Muchacho and Picacho districts, where major mines are now operating. The Mesquite mine in the Pichaco district is the highest ore tonnage producer in California today.

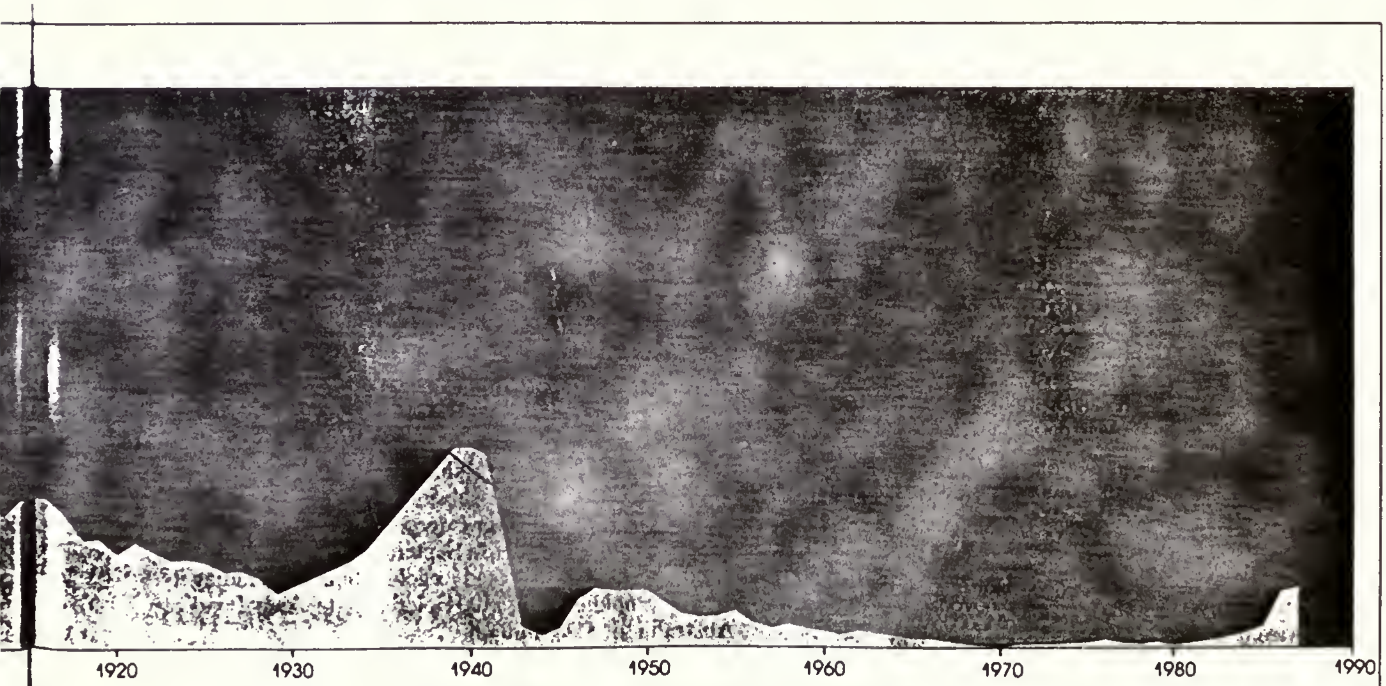
MCLAUGHLIN KEYED RECENT BOOM

Without doubt, Homestake Mining Co.'s discovery of the McLaughlin orebody in 1979 provided the key to the resurgence of California gold production. The McLaughlin mine poured its first dore bar in March 1985, and by the end of the year, production totaled 83,836 oz, nearly equalling California's total state production of the previous year. In 1986, McLaughlin production rose to 173,401 oz.

For the foreseeable future, McLaughlin will be the dominant California gold producer. The McLaughlin orebody is in a unique geological environment, and despite long and extensive prospecting, no similar orebody has been found in the state.

Higher gold prices and new technology both have contributed to growing California gold production. The McLaughlin mine is the only operation in North and South America using oxidized pressure leaching to free gold for subsequent carbon-in-pulp recovery, and new heap leaching technology has been a primary spur to mine development.

Most of the newer California mines use heap leaching and CIP or CIL circuits for gold recovery. Sonora Mining Corp., which has a conventional flotation circuit at its



APPENDIX E5
from California Geology, Feb. 1992

TERTIARY GOLD BEARING MERCURY DEPOSITS OF THE COAST RANGES OF CALIFORNIA

By

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INTRODUCTION

Recently an unsuspected reserve of gold, estimated to exceed 3.2 million ounces, was discovered by Homestake Mining Company at the Knoxville mercury mines in Napa County. This is one of several occurrences of gold associated with mercury or antimony in the Coast Ranges of California (figure 1). These deposits began forming shortly after the implacement of volcanic rocks in the Mid-Tertiary Period and continued to form through Quaternary time. Connate water squeezed from sedimentary units was heated and eventually found its way to the surface via fracture zones. Presumably this hot water, high in chloride (Cl^-), carbon dioxide (CO_2), silica (SiO_2), and containing abundant hydrocarbons, dissolved the gold and mercury contained in the sedimentary units. At the surface, hydrocarbons may have played an important role in the deposition of the gold, in a manner similar to the Carlin-type deposits of Nevada, which closely resemble the gold deposits of the Coast Ranges. Mercury is presently being deposited by hot springs at the Sulphur Bank mine near The Geysers steam field in the Clear Lake area of California.

PREVIOUS STUDIES

The earliest and perhaps one of the most comprehensive studies of the mercury deposits of the Pacific Coast was that of Becker (1888). He determined the presence of gold at mercury mines at Wilbur Hot Springs, Sulphur Bank Hot Springs, and the Knoxville mine area. He also reported the occurrence of gold at the Picacho Mine, located southwest of New Idria. Other workers (Crutchfield, 1953; Newmont Exploration, 1965; Bailey and Meyers, 1949) have identified gold at the Calistoga and Oat Hill mines, and the Stayton District (table 1).

GEOLOGY

The major rock types found in the Coast Ranges are the Great Valley sequence, the Franciscan assemblage, a mafic-ultramafic sequence, and volcanic rocks of Tertiary and Quaternary age. The Great Valley sequence and the Franciscan assemblage consist predominately of marine sedimentary rocks of Late Jurassic to Late Cretaceous age. The Franciscan assemblage consists of graywacke, shale, mafic volcanic rock, chert, limestone, some of which have been metamorphosed to the zeolite and blueschist facies. The Great Valley sequence consists predominately of graywacke, shale, and some conglomerate. The Jurassic section of the Great Valley sequence depositionally rests upon an accumulation of mafic volcanic rocks, that in turn rest upon serpentinized ultramafic rocks. The mafic-ultramafic sequence closely resembles present in-situ oceanic crust (Bailey and Jones, 1970). The Coast Ranges thrust fault separates the Franciscan assemblage from the Great Valley sequence with outcrops of serpentinite occurring on the upper thrust plate.

Much of the mercury in the Coast Ranges occurs in altered serpentinite. Solutions enriched in silica (SiO_2) and car-

1. Wilbur Springs District
2. Sulphur Bank Mine
3. Baker Mine
4. Shamrock Mine
5. Knoxville District
6. Oat Hill Mine
7. Palisade Mine
8. Stayton District
9. Picacho Mine

Figure 1. Tertiary gold deposit occurrences in the Coast Ranges of California associated with mercury or antimony.

bon dioxide (CO_2), rising along faults, have replaced serpentinite by silica-carbonate rock. Silica-carbonate rock typically consists of chalcedony, opal, quartz, magnesite, and calcite.

LOCALIZATION OF ORE

Although over 50 per cent of the largest mercury deposits in the Coast Ranges are associated with altered serpentinite, mercury also occurs in rocks of the Great Valley sequence, the Franciscan assemblage, in Tertiary volcanic rocks, and at active hot springs. Thus, rock type does not appear to be the controlling factor in the deposition of mercury in the Coast Ranges metallogenic province.

The presence of young, high-angle faults appears to be the most important factor in the location of mercury deposits within the Coast Ranges. All mercury deposits are associated with faults and fracture zones. Averitt (1945) suggested that clay gouge zones associated with faulting, effectively channeled mineral-bearing waters, thus controlling mercury deposition at the Knoxville mine.

ORIGIN OF ORE

The origin of the mercury, gold, hydrocarbons, and the water, which acted and still acts as a transporting medium, are all intimately associated with the marine sediments. In a study of thermal and mineral waters in the Clear Lake area, White and others (1973) concluded that the high chloride connate waters found at Wilbur Springs are chemically and isotopically similar to the oil-field waters of the Central Valley of California, but are generally enriched with bicarbonates and boron. This water probably evolved from compaction and loss of pore water in the marine sediments, but is also generated to some extent by the continuing low-grade metamorphism occurring at depth. Hydrocarbons present at Wilbur Springs and Knoxville are common in many of the mercury mines in this region and came to the surface in the same fracture zones that hot mineral-laden water did. At Wilbur Springs, hot water and hydrocarbons (liquid and gas) are ascending in the same fracture system.

Moisseeff (1966) concluded that the mercury at Wilbur Springs probably was concentrated from sediments in "solutions of metamorphic or connate origin." It is likely that the gold has a similar origin. Noting the lack of flour gold in gold-bearing gravels in the Sierras, Graham (1981) sampled the Great Valley sequence (and younger formations), hoping to detect the timing of gold emplacement in the Sierras. He noted a general increase in gold with decrease in age. The Knoxville Formation assayed .001-.002 oz. per ton in gold, and the Eocene formations assayed .006-.008 oz. per ton (Steve Graham, personal communication, 1981). The high chloride content of the water may have facilitated in the remobilization of gold, since in chloride-bearing hydrothermal solutions, gold is transported as the auriferous chloride complex $AuCl_2$ (Radtke and Scheiner, 1970).

As an alternative to this hypothesis for the source of gold, Evans (1981) suggests that gold present in ultrabasic rocks may be chemically dissolved and reprecipitated in placer deposits by the process of laterization. If gold is present in the serpentinites, it could be leached by the connate water present in the system. Although this process may contribute to gold present in the Coast Ranges deposits, it probably is not the only source, since some mercury-gold deposits are not near occurrences of serpentinite.

SOURCE OF HEAT

During Tertiary and Quaternary time the Clear Lake, Sonoma, Tolay, Berkeley Hills, Quien Sabe, and Neenach-Pinnacles volcanic fields erupted in the Coast Ranges, generally decreasing in age northward, and providing an ample source of heat for mercury and gold-bearing hydrothermal solutions. Hot volcanic rocks at depth in the Clear Lake area still provide a source of heat for geothermal fluids. The Geysers geothermal area is believed to be heated by a silicic magma body centered below 10 km in depth, the top of which is within 7 km of the surface (Hearn and others, 1981). At Wilbur Springs, on the basis of a detailed gravity study, a series of 100 m-deep temperature gradient holes, and two deep wells (400 m and 1,200 m), Harrington and Verosub (1981) concluded that the source of heat may be a deep magma intrusion. Fractures within the rock provide the conduits needed to transfer the heat in the form of hot water or steam from the intrusion to the surface.

PARAGENESIS

A paragenetic sequence for minerals has been worked out for the Sulphur Bank mine, Wilbur Springs mines, the Palisades mine and the Stayton District; however, the relationship of gold with other minerals has not been determined. Where gold has been reported at mercury mines in the Coast Ranges, it either occurs as free gold or is contained within the iron sulfides of pyrite or marcasite. The nature of the gold's occurrence has not been determined at the Shamrock mine, Palisades mine and the Stayton District. Investigations at the Palisades mine (Crutchfield 1953, p. 49, 50) and in the Stayton District (Bailey and Meyers 1949, p. 47) have shown that cinnabar was deposited after other base metals. Pyrite was deposited with both the base metals and cinnabar, but it is not known if the gold is associated with cinnabar or other metals.

COMPARISON WITH CARLIN-TYPE DEPOSITS

There are some conspicuous similarities between mercury-gold deposits in the Coast Ranges and the Carlin-type gold deposits which have become the source of large quantities of gold being mined in Nevada. Radtke and other workers (see Boyle, 1980, for a summary) have done the pioneer work on the Carlin-type deposits. From their work a checklist of geologic, mineralogic, and geochemical features common to these types of deposits has been developed. This list includes: silty carbonate rocks, the presence of hydrocarbons, gold associated with mercury, arsenic, antimony, tungsten and thallium, replacement by fine-grained silica and minor pyrite, and mineralization related with large displacement normal faulting. Fluids at these deposits have been shown to be of meteoric origin. Work by Radtke and Scheiner (1970) suggests that the presence of carbonaceous materials (hydrocarbons) may be critical for the deposition of gold.

In the Coast Ranges of California, mercury deposits are largely, but not entirely, restricted to occurrences of serpentinite which has been replaced by silica and carbonate. Hydrocarbons and pyrite are very common in these deposits. The presence of hydrocarbons supports the findings of White and others (1973) that the water which transported the mercury is of connate origin, and that the silty sediments of the Great Valley sequence are the source of the connate water. This water, therefore, has a different source than the water associated with Carlin-type deposits in Nevada. With some exceptions, gold is associated with mercury and/or antimony in the Coast Ranges. The mercury depos-

its of the Coast Ranges are of late Tertiary to Quaternary age and are associated with normal faults.

From this discussion, it can be shown that there are numerous similarities between the mercury deposits in the Coast Ranges of California and the Carlin-type gold deposits. The Knoxville gold deposit is the first major deposit of this type to be recognized in California. However, it is clear that there is evidence for the potential existence of other epithermal gold deposits in California.

ACKNOWLEDGMENTS

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TABLE 1. MERCURY BEARING DEPOSITS (See figure 1).

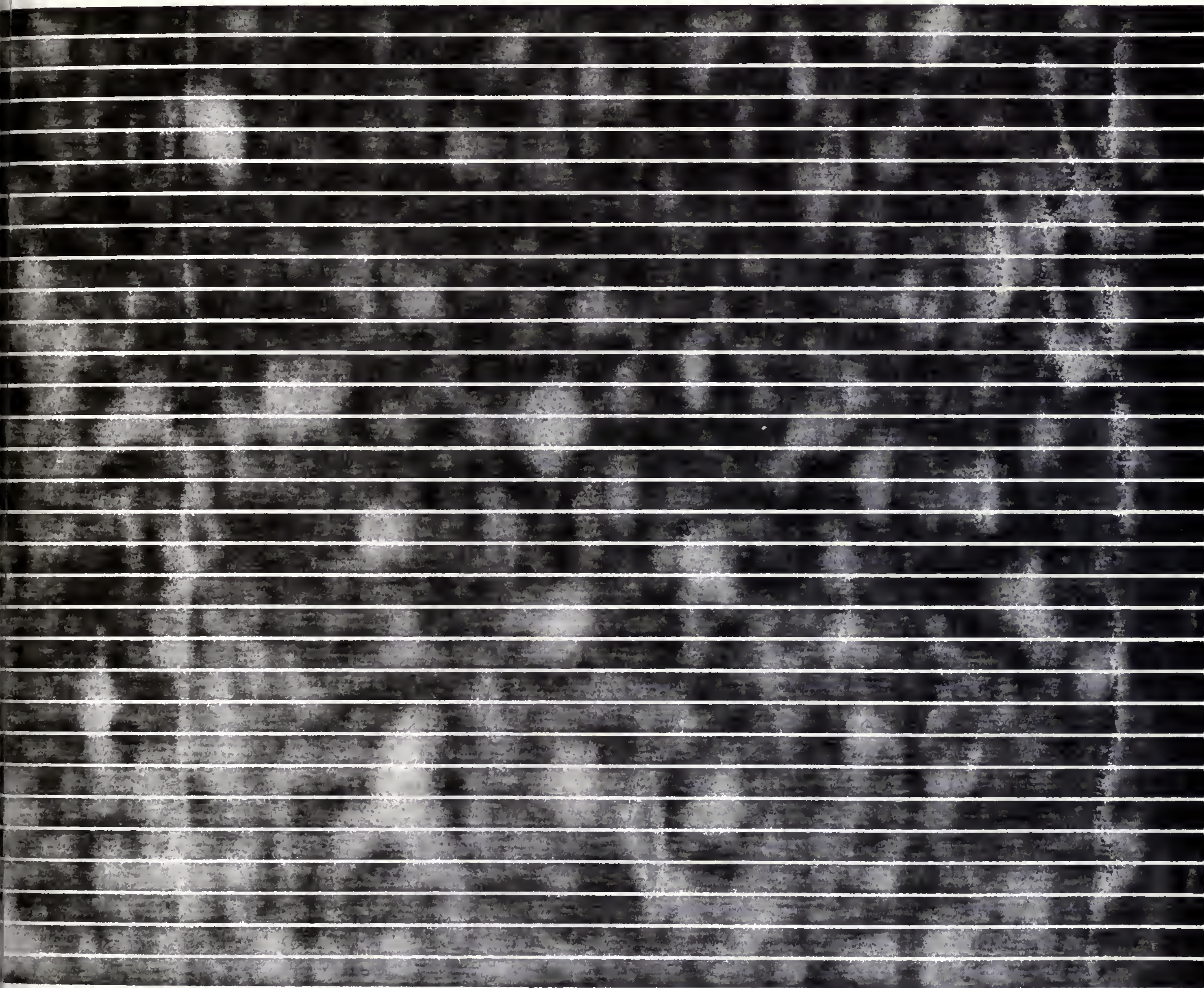
PROPERTY NAME	LOCATION	GEOLOGIC DESCRIPTION
Baker	Section 16, T12N, R6W MDM	► Isolated bodies of serpentinite altered to silica-carbonate rock occur in sediments of the Great Valley sequence. Minerals include cinnabar, meta-cinnabar, pyrite, and marcasite. Marcasite assayed by Becker (1888, p. 368) contained .048 oz. of gold per ton (Brice, 1953).
Knoxville (Knoxville, Manhattan, Harrison, Soda Springs, Reed and Red Elephant mines)	T11, 12N, R4, 5W MDM	► Generally, mercury deposits are confined to silica-carbonate rocks along northwest trending faults, which form the contact between serpentinite and sediments of the Great Valley sequence. At the Manhattan mine mercury ore occurs in altered Tertiary olivine basalt and tuff. Minerals reported from these mines include cinnabar, metacinnabar, pyrite, marcasite, stibnite, native mercury, copper oxides, gold, millerite (nickel sulfide) and redingtonite (hydrous chromium sulfate). Pyrite in the district shows traces of gold (Averitt, 1945, p. 78). Apparently minor leaching has occurred, yielding free gold as reported by Becker (1888, p. 282): The surface soil here (the Manhattan mine) and also near the Redington (Knoxville) mine contains cinnabar, resulting from the erosion of croppings, and accompanying the cinnabar is free gold, which may be found by panning the soil.
Oat Hill	Section 27, 28, 33, 34, T10 N, R6W MDM	► The Oat Hill mine is one of several mercury mines situated along the crest of the broad eastward plunging Mayacmas anticline where the sandstone has been broken by northwest trending normal faults. At the Oat Hill mine the sandstone has been intensely kaolinized and the rock is cut by numerous dense quartz veinlets. Fine cinnabar crystals are disseminated through the altered sandstone, and are associated with calcite and pyrite. Assays of dump material at the Oceola workings were .06% mercury, 4.58% iron, .005 oz./ton gold and .02 oz./ton silver. The material contained an appreciable amount of hydrocarbons and 2-5% pyrite. The dump of the Eureka Workings contained a trace of gold (Yates and Hilpert, 1946, p. 260-262; Newmont, 1965).
Palisades (Grigsby)	Section 24, T9N, R7W MDM	► Two quartz veins which strike N 5°W and dip 70°W occur in extensively fractured, generally flat lying andesite flows and related pyroclastics. Ore minerals (in order of abundance) are chalcopyrite, pyrite, sphalerite, argentite, polybasite, galena, and cinnabar. Gangue minerals are quartz, adularia, and calcite. Marcasite, limonite, and selenite are products of supergene alteration. Cinnabar occurs in minute veinlets accompanied by pyrite and is of later origin than the base metal sulfides. According to Becker (1888, p. 370) assays of silver ore contained antimony and a trace of arsenic. The mine has also produced gold, although Crutchfield (1953, p. 45) was unable to observe any in polished section. He speculates the gold may be contained in the pyrite and chalcopyrite. Crutchfield (1953, figure15), shows that gold was deposited simultaneously with the base metals, rather than the cinnabar.
Picacho	Section 19, 20, T18S, R12E MDM	► Lenses and irregular bodies of silica-carbonate rock occur in a broad shear zone in serpentinite. The mercury ore has been produced from shallow open cuts. Becker (1888, p. 309) indicated that gold and silver were reportedly present (Averill, 1947, p. 59).

(August 1992)

HOMESTAKE MINING COMPANY

McLAUGHLIN MINE

GENERAL INFORMATION SUMMARY



HOMESTAKE

McLAUGHLIN

HISTORY

The McLaughlin deposit was discovered as a direct result of a 1978 reorganization of Homestake's exploration management structure and philosophy. The intensified exploration program was reorganized by function rather than by geographic location or division. Background research in company files led to the development of a new geologic model for the occurrence of gold. Following the model, Homestake investigated a California mercury property located 14 miles to the north of the McLaughlin Mine. Although this deposit did have gold values, it was too small to be economic. Investigations there, however, validated the new model. Encouraged by this early success, exploration was expanded to nearby deposits. In 1978, sampling at the old Manhattan mercury mine, now renamed the McLaughlin Mine, revealed gold at the surface of the ground. Following intersection of the main ore zone on the first drill hole, exploration and development proceeded rapidly and on March 4, 1985, the first gold bar was poured.

SIGNIFICANT DATES

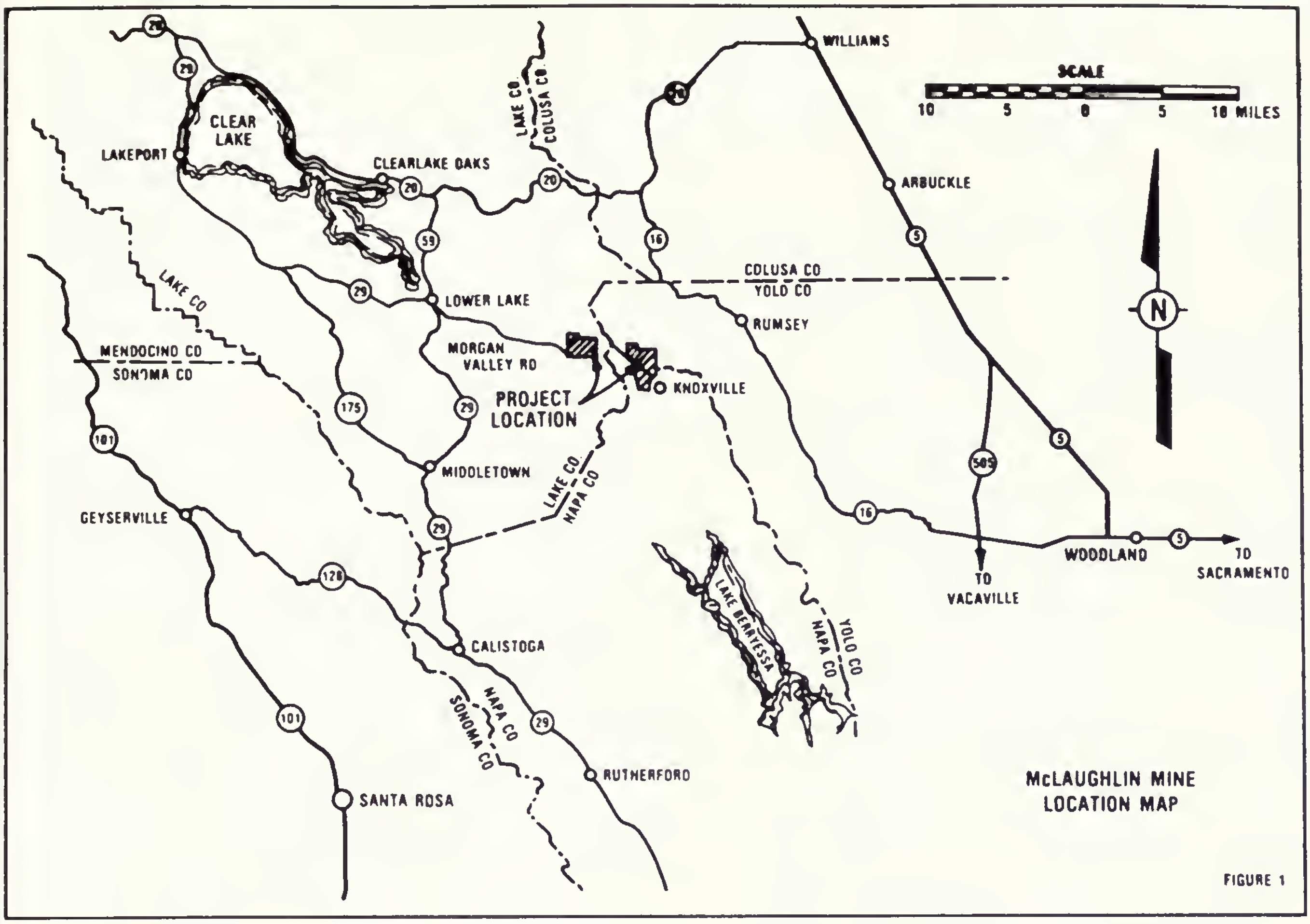
1860's-1978	The Manhattan mercury mine produced 70,000 to 80,000 flasks of mercury.
February 16, 17 & 18, 1978	Initial examination completed at the old Manhattan Mine, as part of Mercury Hot Springs Reconnaissance Program. Gold detected in surface samples and important mineralized system recognized.
October, 1978	Agreement signed with property owner.
December, 1978	Surface exploration began.
September, 1979	Core and rotary drilling program started.
August, 1980	Announcement of discovery of ore body. Environmental baseline studies started. Aggressive claim staking program started.
May, 1981	Exploration completed; design, engineering and environmental studies accelerated.
June, 1982	Napa County chosen as Lead Agency. Environmental baseline documents submitted to counties. Engineering Science chosen as third party EIR consultant.
June 7, 1982	Detailed engineering begun by Davy McKee.
October 7, 1982	Lead agency permit applications accepted as complete. Project Description/Environmental Assessment submitted to all responsible agencies.
July 6, 1983	EIR/EIS certified by Lead Agency.
September 2, 1983	Stage I permits received, construction begun.
December, 1983	Final Use Permits in Napa and Lake Counties approved. BLM approved "Plan of Operations."
April 13, 1984	Yolo County Permits approved.
March 4, 1985	First gold poured.
September 28, 1985	Dedication Ceremonies.
January, 1989	Commissioned Low Grade Ore Circuit, doubling the tons milled per day.
March, 1990	Millionth ounce poured.
December, 1991	Commissioned Flotation Circuit.
February, 1992	1.5 millionth ounce poured.

PROJECT OVERVIEW

Homestake Mining Company has developed a gold mine and extraction facility, the McLaughlin Mine, near the junction of three northern California counties – Napa, Lake, and Yolo. The McLaughlin gold deposit, a disseminated ore body, is estimated to contain 26 million tons of ore averaging 0.127 ounces of gold per ton or 3.3 million ounces of gold. A detailed description of the geology of the deposit is contained in Appendix A.

The Mine is located in a sparsely inhabited region midway between Clear Lake and Lake Berryessa on the Berryessa-Knoxville/Morgan Valley Road approximately 18 miles southeast of Lower Lake in Lake, Napa, and Yolo Counties. The "Knoxville Mining District," in which the project is situated, embraces an area of approximately 50 square miles and includes many mining properties which produced substantial amounts of mercury over the last 125 years.

The project area is about 50 air miles northwest of Sacramento and 70 air miles north of San Francisco. It consists of 16,000 acres owned and 330 acres leased by Homestake plus mining and mill site claims on land under the jurisdiction of the U.S. Bureau of Land Management (BLM). Of the total project area, less than 1,000 acres is currenty disturbed by the project. Project construction began in the fall of 1983 with the first gold produced in March of 1985.



McLAUGHLIN MINE LOCATION MAP

FIGURE 1

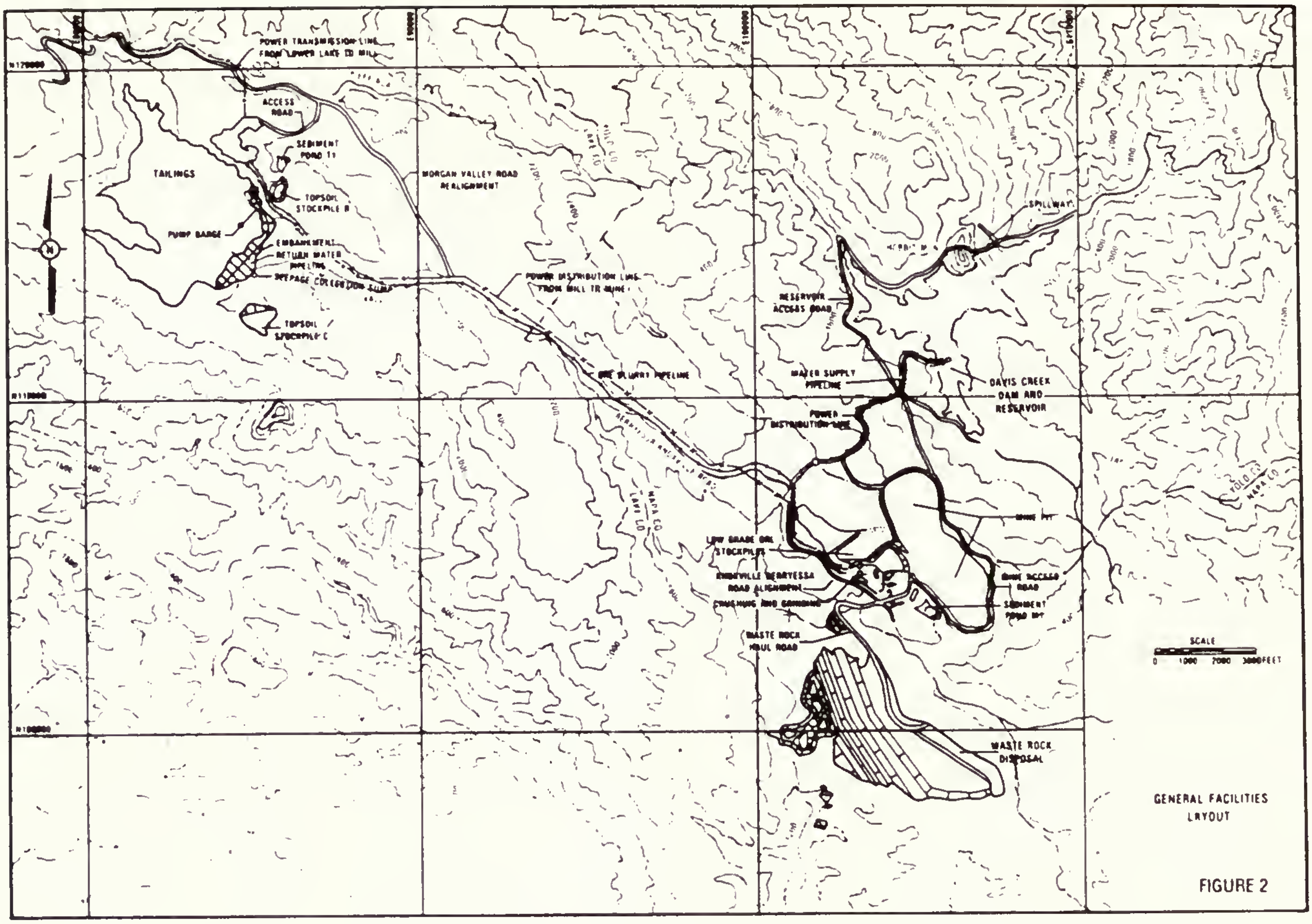
PROJECT DESCRIPTION

GENERAL PHYSICAL ARRANGEMENT: The mine, mill and associated project facilities are distributed in portions of the three counties as follows:

- Napa County – Open pit mine (80%), low-grade ore stockpile, waste rock facility, grinding and crushing area, truck shop, major sediment control ponds, ore slurry pipeline, and environmental monitoring stations.

- Yolo County – Open pit mine (20%), water supply reservoir, and environmental monitoring stations.

- Lake County – Process site, administration building, lab, warehouse, tailings facility, tailings slurry pipeline, ore slurry pipeline, electric transmission line, improved access roads, and environmental monitoring stations.



GENERAL FACILITIES LAYOUT

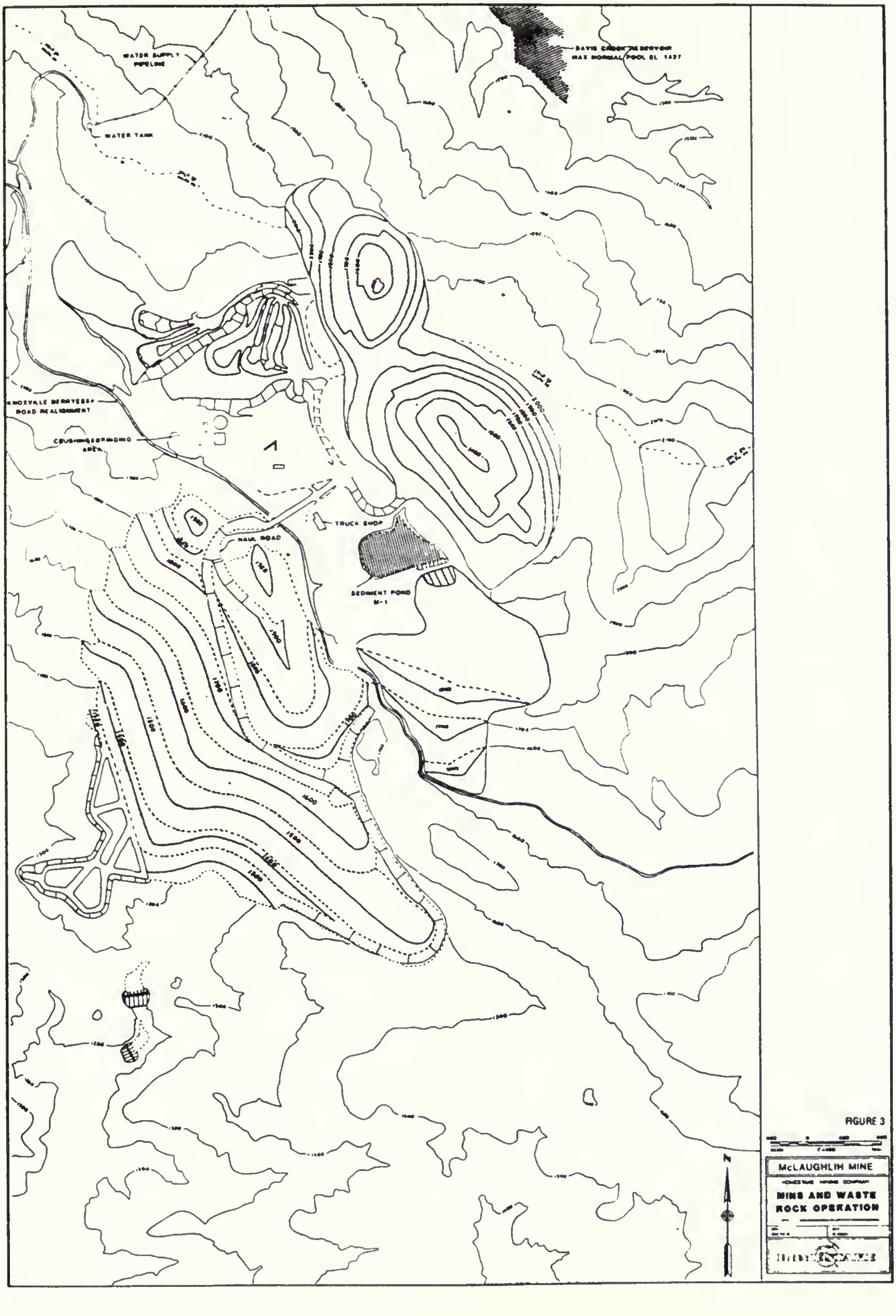
FIGURE 2

MINING

Gold bearing ore is mined by open pit methods beginning with the removal and stockpiling of topsoil for use in later reclamation. Six thousand tons of ore per calendar day are removed along with waste rock and low-grade ore, the latter to be stockpiled for later in the life of the project. The final configuration of the mine pit and waste rock disposal site is shown on the next page. The pit, which is oriented along a northwest-southeast axis, has maximum plan dimensions of about 5,400 feet by 1,900 feet. Pit depth varies from an average of 630 feet to about 800 feet maximum due to topographic changes around the pit perimeter.

Drilling and blasting is used to break rock in the pit. Mining equipment consisting of bulldozers, hydraulic shovels, front end loaders, trucks and graders, typical of large earth moving projects, is used to dig out the broken rock. A detailed list of mine equipment used at McLaughlin and other pertinent mine facts is shown in Appendix B.

Mine air emissions (primarily fugitive dust) triggered by such activities as drilling, blasting, hauling, wind erosion, and crushing and grinding are controlled by wet and dry scrubber systems and an elaborate program using speed limits, water trucks, dust suppressants, and wind screens.


WATER SUPPLY PIPELINE
WATER TANK
TRUCK SHOP
RAIL ROAD
SEDIMENT POND
FIGURE 3
McLAUGHLIN MINE
ROCK OPERATION

GOLD RECOVERY

The gold recovery process is shown schematically below. The sulfide ore treatment circuit was put in operation in 1985. This was followed in the first quarter of 1989 by the startup of a parallel circuit to treat oxide ores (The oxide ores do not require pressure oxidation treatment.) In late 1991, the oxide circuit was modified by the addition of a flotation circuit in order to treat low-grade sulfide ores. The flotation circuit is designed to make a concentrated stream containing most of the gold and sulfur. This concentrated stream, called a concentrate, is then fed to the autoclaves. The waste stream, called the tail, is cyanide leached.

The gold recovery process begins with crushing followed by grinding to the consistency of powder. The ground ore is mixed with water to form a slurry which is pumped to the process area 4.8 miles away. At the process area the sulfide ore must be subjected to an oxidizing pretreatment step. This is accomplished by directing slurry through a pressurized vessel called an autoclave. Combining steam, oxygen, and sulfuric acid with the slurry being autoclaved is crucial to this step. After a short exposure to elevated temperatures and pressures, gold particles within the slurry are liberated. Following autoclaving, the slurry is washed to remove most of the sulfuric acid. The washed slurry is neutralized with lime to obtain a highly alkaline slurry and then sent to the cyanide leach circuit. In the leach circuit, sodium cyanide is added to dissolve the gold. Activated carbon is used to collect the dissolved gold in a carbon in pulp circuit. When the carbon has adsorbed gold to an acceptable level it is removed from the slurry. This is achieved by screening the much coarser carbon particles from the finely ground ore. The gold is then stripped from the carbon using a hot caustic/cyanide solution. The gold in this solution is then electroplated onto steel wool. The steel wool, containing the gold, is then retorted (heated under a vacuum and cooled) to remove any mercury. Then the steel wool is melted with fluxing agents to remove impurities and cast into gold/silver dore' bars. The slurry is piped to the tailings disposal facility after the gold has been removed. Carbon is regenerated on-site and reused in the process. Waters containing acid and dissolved metals are treated with lime in a precipitation circuit, for sulfate and metal precipitation. The addition of lime converts those sulfate and metal species that are in solution into an insoluble species. This allows the water to be reused throughout the process.

The chemicals used in the milling process include sulfuric acid, lime, sodium cyanide, sodium hydroxide, nitric acid, flocculant, and activated carbon. Oxygen is produced on-site. Appendix C contains more detailed information on the gold recovery plant.

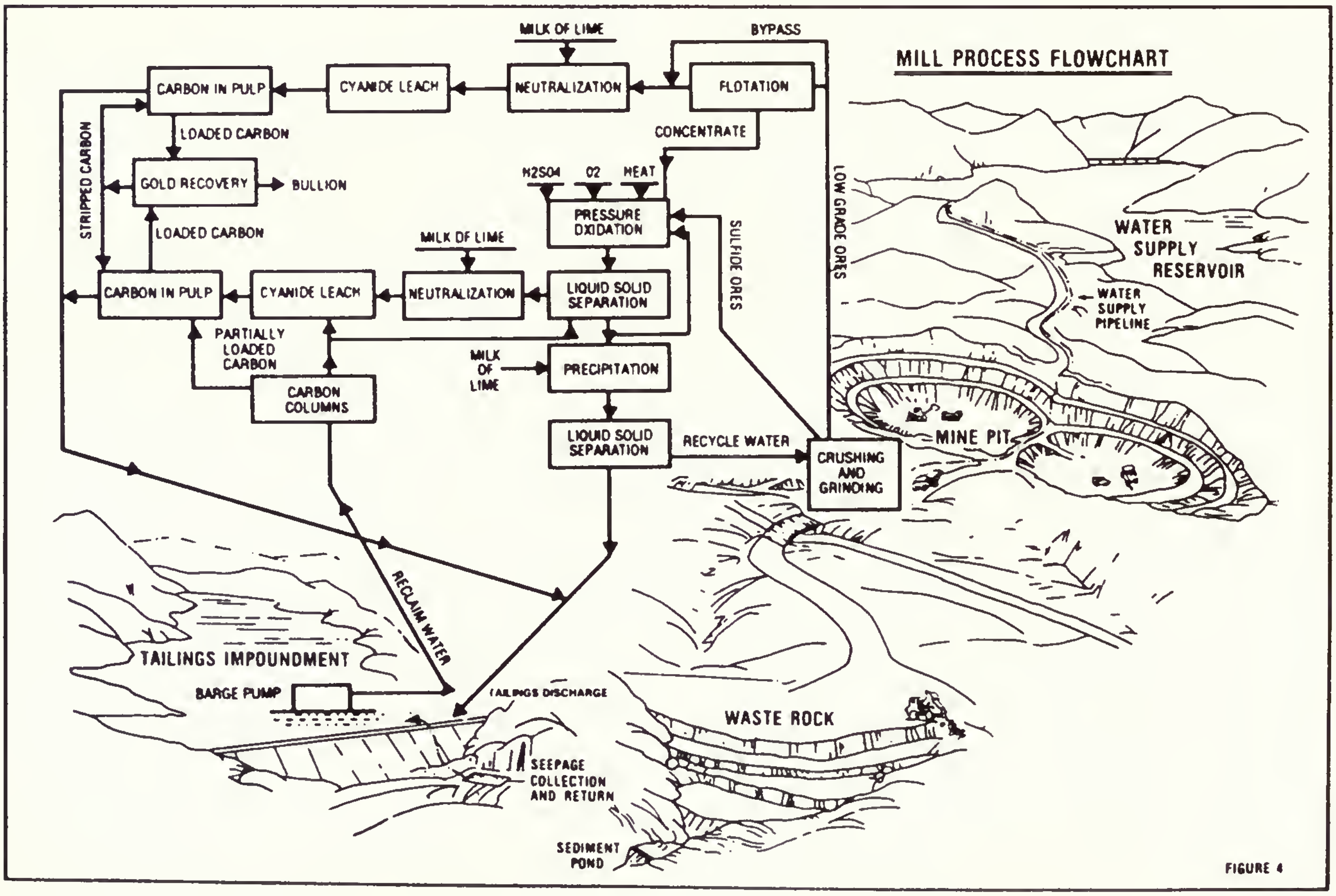


FIGURE 4

WASTE MANAGEMENT

Two principal types of waste are produced at the McLaughlin Mine: waste rock and tailings. Not all the rock excavated at the mine contains gold. That which does not is called "waste rock" or "overburden". This material is disposed of south of the mine in an area with a capacity in excess of 100 million tons.

The facility consists of haul roads, a series of waste rock benches, surface water diversion ditches, underdrains and sediment ponds. The waste rock facility at the end of mining operations is shown in Figure 3. The waste rock is end-dumped in 50- to 100-foot lifts. Relatively flat benches are constructed between lifts so that the final overall slope angle will not exceed 18 degrees (3 horizontal to 1 vertical). Slopes between and connecting the benches are graded to an angle not to exceed 22 degrees (2-1/2 horizontal to 1 vertical) in order to facilitate reclamation, and assure seismic stability.

Springs which occur on the site are captured by the underdrain system which discharges to a sediment pond. Surface water runoff is routed around the facility. Storm runoff from the active dump surfaces is directed to the sediment ponds where solids are allowed to settle.

The lower benches are reclaimed immediately after each bench is completed. The facility can be safely closed either temporarily or permanently at any time during the life of the operation.

Dump leachate is collected and pumped to the qrinding mills for use as process water whenever its quality is not suitable for discharge.

Tailings is the term used for the original gold bearing rock after the gold has been extracted in the process plant. This material is primarily oxidized rock with minute traces of process chemicals. McLaughlin tailings meet the California Department of Health Services' tough tests for a nonhazardous classification. Nevertheless, the tailings facility has been designed to operate as a "zero discharge system" with no consequential discharge of mill process water or effluent to the environment.

The tailings facility, with a design capacity in excess of 28 million tons, is situated in a small, broad valley located southwest of Morgan Valley (Figure 2). This area was drained by a small, intermittent stream with a total catchment area of approximately 1.6 square miles. The basin is underlain with sedimentary rocks with no record of recent active faulting. Permeability of the rock formations which underlie the tailings impoundment are very low, and are generally in the range from about 10^{-6} to 10^{-7} cm/sec (less than the permeability of concrete).

The tailings disposal system consists of a compacted earth filled embankment of siltstone and mudstone, a tailings delivery and distribution system, a water reclaim system, and a small seepage collection and return system downstream from the embankment. The final height of the embankment is 145 feet. Although the impoundment is designed to store the probable maximum flood, the California State Division of Safety of Dams requires that a spillway be constructed at each embankment stage to protect against higher flows.

Runoff from the drainage area above the tailings impoundment is intercepted by a ditch, carried around the impoundment, and discharged into the original drainage downstream from the embankment. The ditches are designed to accommodate the 100-year flood event.

SUPPORT FACILITIES

WATER SUPPLY: The project requires 500 gallons per minute of fresh water to meet mine, mill, and potable water needs. Some of this demand is met by collection and use of project area runoff and groundwater from the mine pit area. A reservoir is required to provide fresh water at a rate of 550 to 655 gpm. The reservoir system, named the Davis Creek Reservoir, consists of a 105 foot-high earth fill dam, impounding a 6,000 acre-foot capacity reservoir, and a piping system. The dam is about 900 feet long with a 100 foot-wide spillway designed to pass the probable maximum flood flow. Outlet valves are provided to allow draw-down of the reservoir in the event of seismic damage to the dam and to release water flowing into the reservoir during the summer season, as required. The Davis Creek Dam is located in Yolo County north of the mine and is shown in Figure 2. A system of pumps and pipes deliver water from the reservoir to the mine and mill.

TOPSOIL MANAGEMENT: Topsoil that is suitable for revegetation was salvaged from areas used for facility construction. This soil will be used in future reclamation. Topsoil is also removed and stockpiled prior to mining activities. Stockpiles are vegetated to prevent soil loss through erosion.

OTHER FACILITIES: The project electrical demand is about 17 megawatts. A 115 kv wood pole electrical transmission line was constructed from the Lower Lake substation to the mine paralleling Morgan Valley Road (Figure 2). In addition, fuel is required for producing steam and operating mine vehicles. Total fuel consumption is about 56,000 barrels per year of diesel, boiler fuel, and gasoline.

Mine and mill employees and supply trucks generate traffic on local roads. Project employees number 350 and are distributed among three shifts.Truck traffic numbers approximately 13 trips per weekday.

Primary access to the project site is from Lake County via Morgan Valley Road which was improved by Homestake.

Continued on next page

SUPPORT FACILITIES CONTINUED

A small section of the Berryessa-Knoxville Road in Napa County was improved and a one-mile section was relocated around the mine support facilities.

A variety of support facilities are required including offices, laboratory, maintenance shops, parking areas, solid waste disposal site, sewage treatment plants, and lighting for nighttime operations and environmental monitoring stations.

RECLAMATION PLAN

Postmining reclamation planning was an integral part of project design and permitting. The goals of the McLaughlin Mine approved reclamation plan are to:

- Minimize erosion
- Stabilize disturbed areas with a permanent, diverse vegetative cover
- Maximize productive land use
- Provide postmining land uses that are socially and environmentally beneficial and compatible with adjacent land uses
- Satisfy requirements of regulatory agencies

Homestake is reclaiming the project site for postmining use as an environmental studies field research station. This station is being developed in cooperation with regional colleges and universities to provide research and instructional opportunities in the physical and biological sciences, environmental management, and mining engineering. Project facilities to be made available to the research station include physical improvements such as roads, parking, power, telephones, water supply, sewage treatment, office, shops, and laboratory.

In addition to these improvements, Homestake will donate to the research station resources such as environmental baseline data, monitoring data accumulated over the life of the project, numerous sets of aerial photographs, extensive mapping, and geologic core. Although Homestake intends to retain ownership of project lands pending future mining, it is expected that the research station will be established as a nonprofit corporation and managed by a board of directors representing participating institutions and Homestake.

The reclamation plan proposes postmining land uses for each facility as summarized in Table 1. The mill is on a ridge dominated by Blue Oak Woodlands which are of moderate wildlife value. The tailings impoundment will be closed, covered with topsoil and appropriately revegetated. Ultimately this area will be returned to grazing.

The pit will be fenced to provide for public safety and vegetative screening will be established along the road and upper benches to minimize visual impact. Reclamation of the waste rock, mine facilities and low-grade storage pads will provide approximately 485 acres for wildlife habitat. Wildlife habitat value and visual composition will be enhanced by both grasses and woody plants.

Following mining, the reservoir in Yolo County will be maintained at maximum normal pool to provide water and habitat for wildlife. A permanent water body in this location will provide long-term wildlife benefits.

Other facilities including the process plant, crushing plant and grinding mills, slurry pipeline, and hydrologic control structures will be removed and the areas reclaimed to be compatible with surrounding land uses and habitat types.

TABLE 1
Comparison of Premining and Postmining Land Use by Facility

FACILITY	*COUNTY*	*ZONING CLASSIFICATIONS*	*LAND USE*	
			PREMINING	*POSTMINING*
Mine Pit	Napa	Agricultural Watershed (AW)	Mercury Mining	Potential Mineral Resource, Wildlife
	Yolo	Agricultural General (A-1)	Grazing/Non-commercial Woodland	
Mining Facilities Area	Napa	Agricultural Watershed (AW)	Wildlife/Watershed	Wildlife, Watershed
Mill	Lake	Unclassified	Grazing	Research Station Headquarters
Reservoir	Yolo	Agricultural Preserve (AP)	Grazing	Water Supply, Recreation, Wildlife
Tailings Site	Lake	Unclassified	Grazing	Closed Waste Disposal Facility, Grazing, Wildlife
Waste Rock and Low-Grade Ore	Napa	Agricultural Watershed (AW)	Wildlife/Watershed Recreation	Wildlife, Watershed

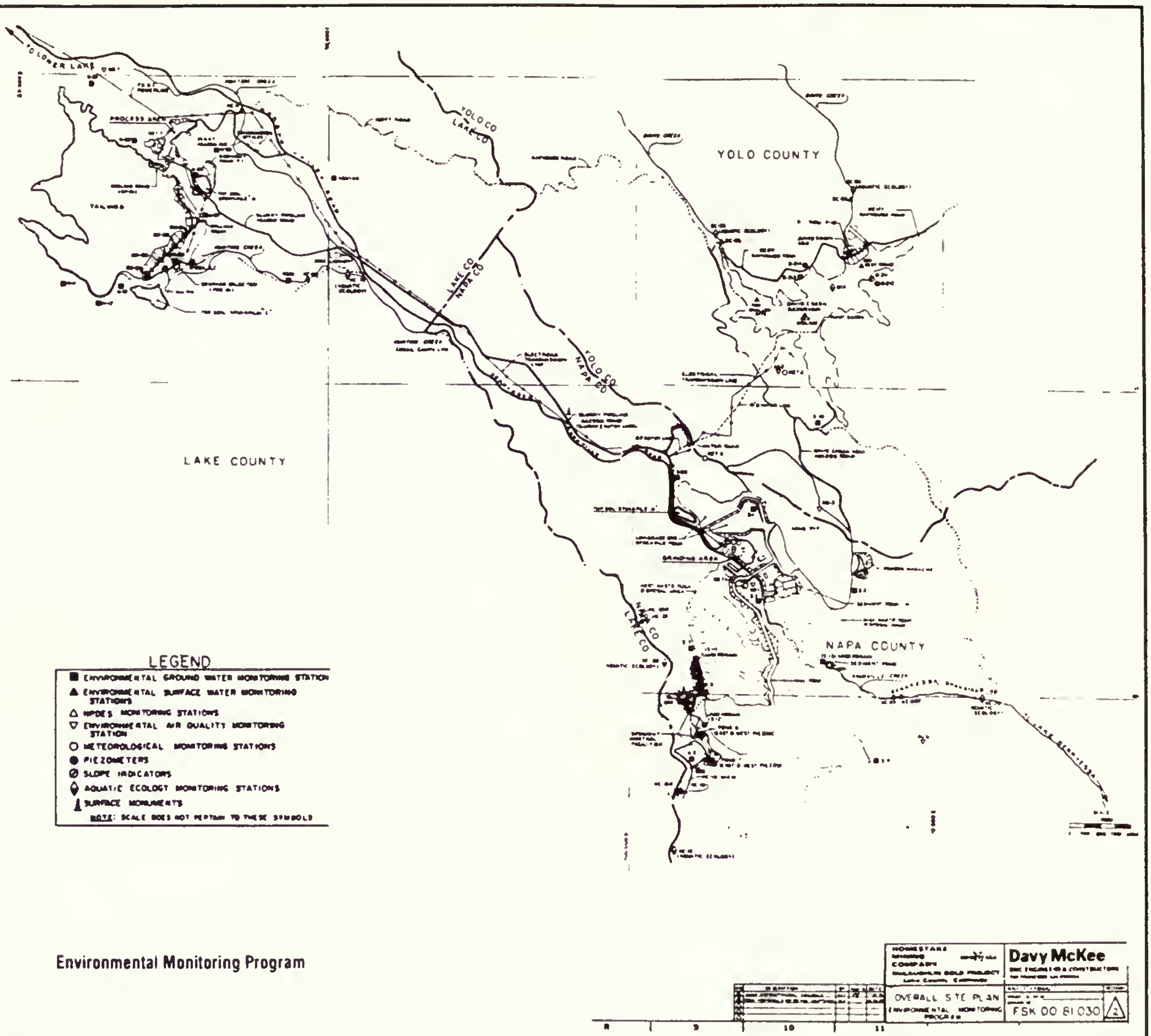
ENVIRONMENTAL MONITORING PROGRAMS

Environmental monitoring programs initiated during baseline data collection have been continued to provide early indication of adverse changes in the local environment. Programs implemented include the following:

- Air Quality
- Meteorology
- Surface and Groundwater Quality
- Aquatic Ecology
- Vegetation
- Wildlife
- Geologic Hazards
- Cultural Resources
- Noise
- Socioeconomics

Homestake has implemented a multipurpose land management program on their lands contiguous to the mining area. Management units are as follows:

- Intensive agriculture
- Mixed woodlands
- Chaparral
- Preservation areas
- Reservoir



Environmental Monitoring Program

FIGURE 5

The McLaughlin deposit occurs along a major thrust fault which strikes N40 degrees W and dips variably northeastward. The upper plate rocks are composed of bedded siltstones, mudstones, and sandstones of the Upper Jurassic (150 million year) and younger Great Valley Sequence. The lower plate rocks consist chiefly of a serpentinite melange derived from the Coast Range ophiolite and lesser Franciscan Complex lithologies. The fault zone contains a mixture of both upper and lower plate rocks that have been intensely sheared. The resulting material consists of coherent blocks set in a matrix of flakey fault gouge.

About 2.2 million years ago, the thrust zone was invaded by basaltic magmas resulting in two stages of volcanic activity. The earlier stage involved small but violent eruptions resulting in deposits of volcanic ejecta, small craters, and fragmental intrusives. The second stage resulted in the emplacement of olivine-pyroxene basalt sills, domes, and minor flows.

Hydrothermal activity accompanied lithification of shallow magmas. Fluid flow paths were related to both early fault zone permeability and later volcanic vents. All rock types in the deposit are hydrothermally altered and locally host gold-bearing veins. Early silica-flooding hardened the poorly indurated materials permitting the development of open fractures as a result of regional strike-slip stress. These open spaces were filled with vein matter, creating a stockwork deposit. Surface geysers and hotsprings deposited a chalcedonic sinter terrace.

Mercury (as cinnabar) was localized in the shallow parts of the system and was the object of early mining efforts. Native gold occurs as submicroscopic to rare coarse grains in the chalcedony-quartz veins together with silver (as sulfosalts) and a variety of other minerals including stibnite, pyrite, barite, calcite, dolomite, and adularia.

The McLaughlin deposit is considered one of the best preserved and finest examples of a hot springs type epithermal gold deposit on Earth. Geologic research will continue throughout the mine life.

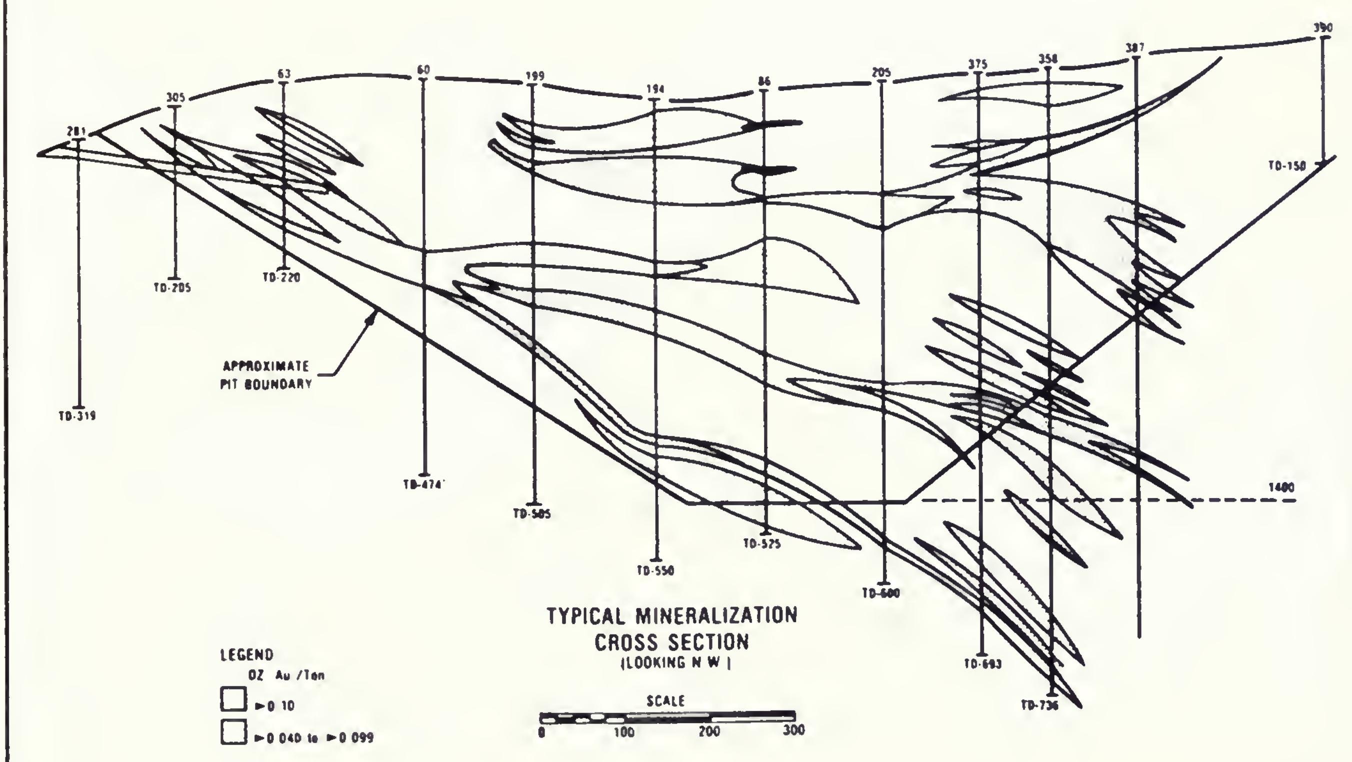
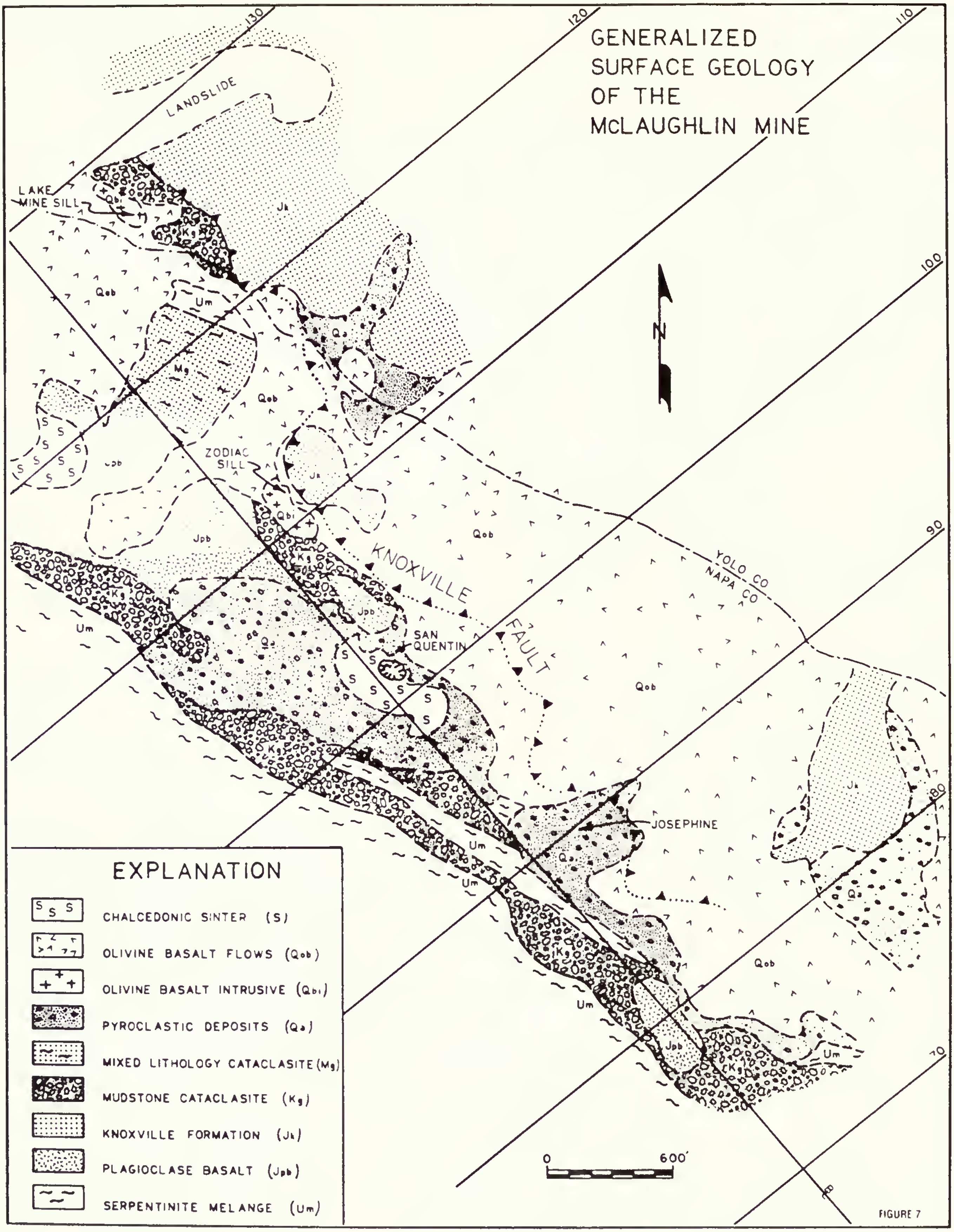


FIGURE 6


GENERALIZED
SURFACE GEOLOGY
OF THE
McLAUGHLIN MINE
130
120
110
100
90
80
70
LANDSLIDE
LAKE
MINE SILL
ZODIAC
SILL
KNOXVILLE
FAULT
SAN
QUENTIN
JOSEPHINE
YOLO CO
NAPA CO
N
0
600'
EXPLANATION
CHALCEDONIC SINTER (S)
OLIVINE BASALT FLOWS (Qob)
OLIVINE BASALT INTRUSIVE (Qbi)
PYROCLASTIC DEPOSITS (Qa)
MIXED LITHOLOGY CATACLASITE (Mg)
MUDSTONE CATACLASITE (Kg)
KNOXVILLE FORMATION (Jk)
PLAGIOCLASE BASALT (Jpb)
SERPENTINITE MELANGE (Um)
FIGURE 7

OPEN PIT MINE — APPENDIX B

ORE RESERVES as of January 1992	15,650,000 tons
AVERAGE GRADE	0.113 ounces gold average per ton
CONTAINED OUNCES	1,775,000 ounces gold
CUT-OFF GRADE	0.06 ounces gold per ton for Sulfide Ore 0.02 ounces gold per ton for Oxide Ore
WASTE ROCK	40,000,000

ULTIMATE PIT DIMENSIONS

Length	5,400 feet
Width	1,900 feet
Depth	800 feet maximum 630 feet average

RAMPS

In Pit	8%
Waste Dump	8%
Width	100 feet from berm to berm

MINING SCHEDULE

Year	Shifts Per Day	Tons Per Year
1985	1	4,200,000
1986	2	12,000,000
1987-1989	3	13,300,000
1990	3	12,000,000
1991	3	15,000,000
1992	3	12,000,000

HYDRAULIC SHOVEL

1 O&K RH 120 C

Cubic Yard Bucket Capacity	17 yards
Operating Weight	469,000 lbs.
Crowd & Breakout Force	202,400 lbs.
Rated Horsepower	1200

1 P&H 1550

Capacity	15 1/2 Cubic Yard
Operating Weight	463,000 lbs.
Crowd & Breakout Force	184,000
Rated Horsepower	1,100

FRONT END LOADERS

4 Caterpillar 992-C

Cubic Yard Bucket Capacity	13.5 yards
Weight	200,000 pounds
Width	15'7"
Height	17'9"
Rated Horsepower	690

TRUCKS

14 Caterpillar 777

Truck Capacity	85 tons
Length	32'1"
Width	17'11"
Height	16'1"
Tires	27.00-49,42 PR(E-3)
Total Truck Weight	65 tons empty; 150 tons loaded
Rated Horsepower	870

DRILLS

3 Ingersol DM 45 Crawler

Mast Height	36 feet
Weight	70,000 pounds
Rod Length	25 feet
Diameter of Hole	6 1/2" to 7 7/8"

1 Driltech D40K Truck Mount

Reverse Circulation Drill

Mast Height	35 feet
Weight	54,800 pounds
Rod Length	25 feet
Diameter of Hole	5" to 7 7/8"

MISCELLANEOUS

1 375A Komatsu Dozer	1 D10N Caterpillar Dozer
1 D9L Caterpiller Dozer	1 D8L Caterpillar Dozers
1 824C Caterpillar R.T. Dozer	3 R35 Trucks Euclid
1 Finning Secondary Drill	2 Caterpillar 235 Backhoes
2 Caterpillar 16G Graders	4 Caterpillar Forklifts
1 Boom Truck	1 4,000 gal. Water Truck
3 14,000 gal. Water Trucks	1 Pit Service Truck
1 Lowboy and Tractor	13 Pickups
3 pit Lube Trucks	1 10 yd. Utility Dump Truck
1 998 Caterpillar Loader	1 10,000 gal. Water Trucks

PROCESS PLANT OXIDE CIRCUIT — APPENDIX C

PRODUCTION	
	Schedule: Three 8-hour shifts, 7 days per week, 365 days/yr.
FEED RATE	
	1,095,000 tons per year or 3,000 tons per operating day or 125 tons per hour
MAJOR EQUIPMENT ITEM	
Stationary Stacker	15,000 ton storage capacity 42" wide, 226' long
Semi-autogenous Grinding Mill	Koppers 22' diameter x7' long; 1750 HP motor
Ball Mill	14'6" diameter by 23' long; 3000 HP motor
Thickener	150 feet diameter by 16'high
Slurry Pumps	GEHO positive placement; Diaphragm type 200 HP
Slurry Pipeline	8" diameter by 25,600 feet long Carbon steel seamless

PROCESS PLANT FLOTATION CIRCUIT — APPENDIX C

Rougher Flotation Cells (7)	1000 ft^3 Wemco Cells
Cleaner Flotation Cells (3)	500 ft^3 Wemco Cells
Flotation Tailings Thickener	150 feet diameter by 16' high conventional
Concentrate Thickener	Enviro Clear 20 foot diameter high rate

PRODUCTION	
	Schedule: Three 8-hour shifts, 7 days per week, 365 days/yr.
FEED RATE	
	1,095,000 tons per year of 3,000 tons per operating day or 125 tons per hour
MAJOR EQUIPMENT ITEM	
Primary Crusher	42"x66" Gyratory Traylor-Fuller
Radial Slewing Stacker	30,000 ton storage capacity 42" wide, 161.5' long
Semi-autogenous Grinding Mill	Koppers 22' diameter x7' long; 1500 HP motor
Ball Mill	15'6" diameter by 22' long; 3000 HP motor
Thickener	150 feet diameter by 8' high
Slurry Pumps	GEHO positive placement; Diaphragm type 200 HP
Slurry Pipeline	8" diameter by 25,600 feet long Carbon steel seamless
Recycle Water Pipeline	12" diameter by 25,000 feet long
Preoxidation Thickener	Environclear 55 feet diameter High rate 316 stainless steel
Autoclaves	Three horizontal cylindrical, four compartment, mild steel shell, leadlined and bricked with two courses brick 13'9-½" inside shell diameter; 53'1-⅛" overall length.
CCD Thickeners	Enviroclear 55 feet diameter High rate 316 L S.S
Neutralization Tanks	Three 42,000 gal. capacity, 20' diameter x 20'high
Precipitation Tanks	Three 83,500 gal. capacity, 25' diameter x 25' high
CIP Tanks	Twelve 120,000 gal. capacity, 27' diameter x 30' high
Carbon Strip Tank	4,600 gal capacity, 7' diameter x 23'4" high 100 PSIG
Mercury Retorts	Two Saracco tanks; vacuum retort type, water bath condenser, 36 kw

Continued on next page

PROCESS PLANT SULFIDE CIRCUIT — APPENDIX C

MAJOR EQUIPMENT ITEM CONTINUED

Melting Furnace	Tilting induction type, 250 kw
Bullion Molds	1,000 troy oz. capacity
Regeneration Kiln	Indirect fired; 35½" diameter x 35' long
Lime Silos	Four 450-ton live capacity 21'6" diameter x 52' high

TAILINGS SYSTEM

TAILINGS DAM

Height of dam	Phase I – 98 feet Phase I – 10 million tons Phase II – 145 feet Phase II – 28 million tons
Surface area	360 acres
Tails line length	13,770 feet
Total disturbed area	560 acres
Length of dam	3,950

WATER SUPPLY

Supplied by surface waters impounded behind Davis Creek Dam

Height of Dam	105 feet
Width of Dam	953 feet
Capacity	6,000 acre feet
Surface area	190 acres
Water usage	1,200 acre feet/year fresh water

POWER SUPPLY

Provided by 13 mile 115 KV power line from Lower Lake.
A 12 kv underbuilt line provides power to residents along route.

McLAUGHLIN MINE
AWARDS and COMMENDATIONS

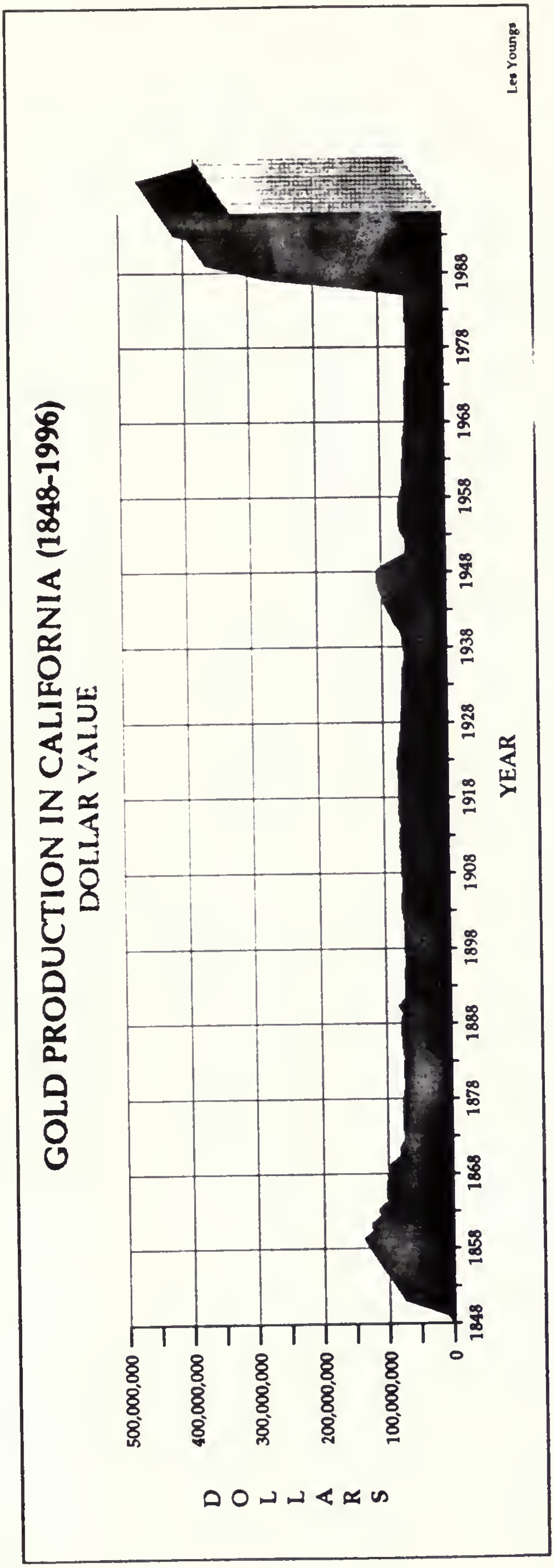
- △ Wildlife Habitat Enhancement Council (WHEC) Recertification – 1992
- △ Employer of the Year – 1992
- △ CMA "Safe Mine Award" – 1991
- △ BLM "Partner in the Public Spirit" – 1991
- △ Lake County Air Basin "Clean Air Achievement" – 1991
- △ Finalist Dupont "Environmental Leadership" – 1991
- △ Employer of the Year – 1991
- △ Wildlife Habitat Enhancement Council Award – 1990
- △ BLM "Protection of Flora & Fauna" – 1989
- △ Soil Conservation Society of America – 1986
- △ Sierra Club Commendation – 1984

APPENDIX E7
from Homestake Mining Company
"Supplemental Information 1995"
(internal document)

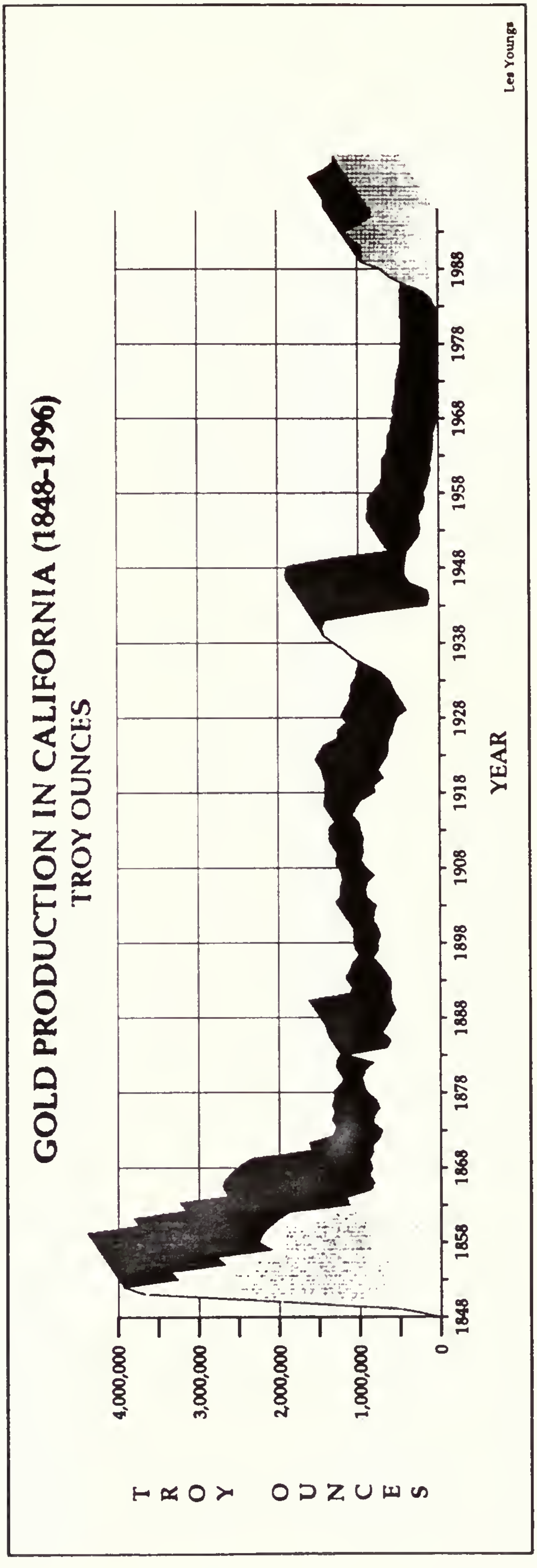
McLAUGHLIN MINE

Ownership:	Homestake owns 100%
Location:	Knoxville Mining District, junction of Napa, Lake and Yolo counties, northern California
Initial Production:	1985
Properties:	Approximately 16,200 acres
Mining Method:	Open pit
Mill Capacity:	During 1996 modifications will be made to the mill circuit which will increase plant capacity to 6,500 tons per day for the processing of stockpiled ore.
Recovery Process:	Autoclaves, cyanide leach, carbon-in-pulp and flotation. The autoclaves will shut down in mid-1996 when mining is completed. Processing of low-grade stockpiles by direct cyanide leach will continue for an additional eight years.
Production:	Gold dore

	1995	1994	1993	1992	1991
Ore Reserves:					
Tons (000's)	19,342	22,064	22,042	14,296	15,650
Average grade (oz/ton)	0.068	0.075	0.083	0.105	0.113
Contained gold (oz 000's)	1,315	1,665	1,839	1,504	1,775
Production:					
Ore mined - tons (000's)	2,056	2,667	2,043	2,608	2,353
Stripping ratio (waste:ore)	5.9:1	5.6:1	6.5:1	4.6:1	5.7:1
Ore milled - tons (000's)	2,296	2,244	2,164	2,051	2,298
Grade (oz/ton)	0.120	0.126	0.154	0.164	0.125
Recovery (%)	88	87	92	87	91
Gold produced (oz 000's)	242	250	305	291	263
Total Cash Cost per Ton Milled	$26	$28	$27	$29	$25
Costs per Ounce:					
Direct mining costs	$245	$233	$188	$191	$208
Inventory movements and other	(11)	8	(3)	2	3
Cash Operating Costs	234	241	185	193	211
Royalties	8	8	8	9	8
Total Cash Costs	242	249	193	202	219
Depreciation and amortization	102	74	103	119	117
Reclamation	9	5	4	4	3
Total Production Costs	$353	$328	$300	$325	$339
Operating Earnings (Loss) ($000's)	$7,848	$13,746	$18,464	($9,415)	$4,942
Number of Employees at December 31	346	343	343	321	336



DEPARTMENT OF CONSERVATION
Division of Mines and Geology



DEPARTMENT OF CONSERVATION
Division of Mines and Geology

Page No. 1
12/05/97

YEAR	IC8252PROD	RELEASE_OK	SOURCE	
~~1961~~	~~18688~~	~~Y~~		
1962	15951	Y	MINERALS YEARBOOK	
1963	13592	Y	MINERALS YEARBOOK	
1964	10291	Y	MINERALS YEARBOOK	
1965	13404	Y	MINERALS YEARBOOK	
1966	16070	Y	MINERALS YEARBOOK	
1967	16385	Y	MINERALS YEARBOOK	
1968	21384	Y	MINERALS YEARBOOK	
1969	18491	Y	MINERALS YEARBOOK	
1970	18604	Y	MINERALS YEARBOOK	
1971	13489	Y	MINERALS YEARBOOK R	
1972	5835	Y	MINERALS YEARBOOK R	
1973	1219	Y	MINERALS YEARBOOK	
1974	1311	Y	MINERALS YEARBOOK	1975 Production data withheld
1976	296	Y	MINERALS YEARBOOK	
1977	~~0~~	Y	MINERALS YEARBOOK	Production data withheld for 1977
1978	~~0~~	Y	MINERALS YEARBOOK	NO DATA for 1978
1979	151	Y	MINERALS YEARBOOK	
1980	226	Y	MINERALS YEARBOOK	
1981	85	Y	MINERALS YEARBOOK	
~~39416~~	~~185472~~			

The above are production data for mercury reported by the U.S. Bureau of Mines in the Minerals yearbook for the years after 1961 – the last year of production listed in the table from U.S Bureau of Mines Information Circular 8252.

Total Mercury production for California obtained by adding the IC 8252 data (1850-1961) and the above listed data is 2,938,451 flasks.

RKC.

courtesy Ron Churchill, Senior Geologist, State of California Department of Conservation, Division of Mines and Geology.

San Francisco Chronicle TUESDAY, JAN. 22, 1980

Gold Hits $850 in Zurich — Dollar Gains in Europe

New York

Gold surged to a record $850 an ounce close in Zurich yesterday, and silver hit $49 an ounce at one point, with prices of both metals going "up, down and sideways" before closing in New York at $826 and $46 an ounce, respectively.

The U.S. dollar closed stronger on most European markets yesterday.

Gold closed in Zurich at a new record high of $850 an ounce, up $10 from the previous European record of $840 set in Zurich at Friday's close. At one point during afternoon trading, it hit $860.

In London, gold hit a record $850 at the afternoon price-fixing, but was $825 an ounce at the close, down from $835 at Friday's close.

In New York, gold traded in a range of $815-$887 an ounce. Dealers said the wide range, however, was more an indication of thin markets than the true level of bullion trading. Gold still closed above the Friday New York close — $826 versus $810. Silver was $1 lower than on Friday at $46 an ounce at the close. The Comex settlement prices were $825.50 for gold and $44 an ounce for silver.

The New York Commodity Exchange did not open trading in silver until 1:30 p.m. When trading opened it was for liquidation (selling) of contracts only. This is an attempt to force long positions to sell, preventing a "corner" or "squeeze" in physical silver.

But dealers said previous limits on the number of contracts an individual can hold accomplished that purpose and that, as a result of the latest action, many positions will be switched to European markets.

"Tuesday's trading in Europe may follow the pattern of most recent trading days," said one dealer yesterday. "New York sells down and Hong Kong and Europe bid the price up."

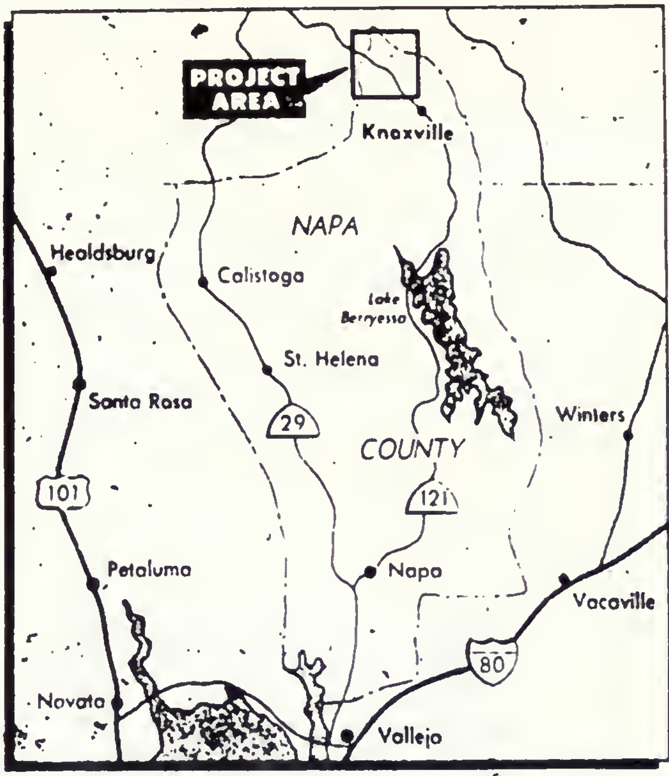
The Comex earlier increased the margin (cash) required to buy a gold contract to $15,000 from $5000 and the International Monetary Market in Chicago raised the margin to $9000 from $5000.

Foreign exchange markets were quiet, dealers said, with the dollar chalking up gains on most markets. European closing prices with New York close in parentheses:

Zurich 1.5960 Swiss francs, up from 1.58825 (1.6045); Frankfurt 1.7265 marks, down from 1.7320 (1.73); Paris, 4.0425 francs, up from Friday's 4.03125, (4.0530); Brussels 28.865 Belgian francs, down from 28.885 (28.08); Amsterdam, 1.9050 guilders, up from 1.8990 (1.9082); Milan, 805.30 lire, up from 804.80 (805.05), Friday.

United Press

Big Gold Find in Napa County



By Timothy C. Gartner

Homestake Mining Co. said yesterday it has discovered "significant gold mineralization" about 20 miles north of Lake Berryessa in Napa County that is worth more than $630 million at current market values.

The San Francisco company, which is the nation's largest gold producer, said the gold deposit is located in hilly grazing land north of Knoxville where the Napa, Lake and Yolo county lines meet.

Harry M. Conger, president and chief executive officer of Homestake, said preliminary tests indicate that the deposit may contain in excess of 1 million ounces of gold. In London, the price of gold at the afternoon fixing was $633.85 an ounce.

Conger said the California gold is in "finely disseminated particles which cannot be panned and are not visible to the eye. For this reason, prospectors during the 1849 California Gold Rush by-passed the area as unpromising."

He said he preferred to use the term "mineralization" instead of vein or ore deposit until the find is officially confirmed by extensive testing. "We think it's economically feasible," Conger said, "but until that's proved beyond any doubt, we'll continue to call it a mineralization."

Under the direction of James A. Anderson, Homestake's vice president of exploration, the company over the past two years has launched an aggressive exploration program to expand gold production.

The Knoxville area has been mined intermittently for the past

[illegible]

Gold Find in Napa County Announced

From Page 29

100 years, but it is an area where gold was not previously mined.

For 12 months, 10 Homestake employees and three drilling rigs have been at work in the northern corner of Napa County. During that time they have punched 63 holes — at depths of 300 feet — to take core samples.

The results are that Homestake estimates the deposit contains in excess of 6 million tons with an average grade of approximately 0.17 ounces of gold per ton, containing some 1 million ounces of gold.

That recovery figure is somewhat similar to the ore presently being mined at the company's main gold mine at Lead, S.D., in the Black Hills. An estimated 280,000 ounces of gold will be mined at Lead this year.

Conger said Homestake so far has invested about $2 million in the Knoxville gold find. He said the company will conduct more extensive engineering, metallurgical, environmental and economic studies of the deposit over the next 12 months before making a final decision on opening a mine.

"But we're disclosing the discovery now because our tests show this is a material event for the company," said Conger.

"Based on current expectations, we could have a mine and mill in operation for early 1984," he said.

The project could ultimately take 10 years and cost around $100 million and employ 150-200 persons, said Conger.

The deposit, which now runs about a quarter of a mile long by an indeterminate width, is shallow and can be mined by surface methods. Conger said Homestake envisions open pit mining, which is a verticle type of drilling, to recover the gold.

In the Black Hills, Homestake's is mining ore at depths up to 1½ miles.

Homestake controls, either through direct ownership or mineral rights, about 10 square miles of property at the California site.

In addition to gold mining, Homestake produces silver, uranium, lead and zinc. In the first half of 1980, Homestake earned $57 million, up 147 percent over a year ago, on sales of $172 million. The average selling price for gold was $587 an ounce compared to $249 a year earlier.

Gold Prices Rise — Dollar Slips

New York

The U.S. dollar closed lower in Europe yesterday, firmed slightly in New York, then slipped again in the late afternoon.

In Zurich gold closed at $632.90 an ounce, compared to Tuesday's close of $629.50.

In London the close was $634.50, up from $631.50. In New York gold closed at $633.50, compared to $630.25 the previous day.

The Comex settlement price was $632.30, compared with $630.20.

In London, the pound moved ahead, closing at $2.3910, compared to $2.38, and it rose to $2.3935 in New York.

United Press

San Francisco Chronicle

The Largest Daily Circulation in Northern California

★★★★ MONDAY, SEPT. 1, 1980

APPENDIX E12

Gold Rush Of 1980 Is Raging

By Jerry Telfer

Marvin Jeffries, an idle construction worker, panned his claim on Italian Bar, near the town of Columbia

A New Breed of California Prospectors

The gold mania rages with intense vigor, and is carrying off its victims hourly and daily.

— New York Herald, Dec. 11, 1848

By Stephen Magagnini

They are leaving Orange County construction sites, Pennsylvania print shops and hog farms in Kansas for dank, abandoned mine shafts in Alleghany, ancient river channels in Calaveras County and chilly creeks throughout the Mother Lode.

They are using RVs, off-road vehicles, Porsches and mules; pans, suction dredges, "sniffers" (over-sized medicine droppers), "gold hounds" (automatic panning devices), sluice boxes and trommels (devices similar to washing machines), "doodle-bug" dredges (barges with drag-lines), backhoes and dynamite — whatever time and money will afford — to ferret out the gold.

From the soft, steamy banks of the Stanislaus River to the rugged Sierra mountain ranges, California of 1980 is having that recurring golden dream. A new breed of prospectors — with a resolve that would do the '49ers proud — is sifting through ocean beach sands, picking through Mojave Desert dry-washes and staking claims in virtually

Page 4 Col 1

The Gold Rush of 1980 Rages in California

From Page 1

every county in the state.

The trickle of romantics who took to the hills after the government deregulated gold in 1974 has swelled into a tidal wave of treasure hunters this summer, with an ounce of the seductive metal teasing the $700 mark.

"There are 100,000 people prospecting on any given weekend right now in California," said George (Buzzard) Massie, president of the 40,000-member Gold Prospectors Association of America — and Massie is only talking about the surface or "placer" miners who, come summer when the water is low and the living is easy, comb riverbeds at Rattlesnake Gulch, Rough and Ready, Murderer's Bar and other bygone bonanzas.

Even skeptics like U.S. Forest Service Officer Dean Price concede the Gold Rush of 1980 is on.

"Before this year I never really believed in gold fever," said Price, a 14-year veteran of the forest service in Weaverville, Trinity County. "But this year I've seen it where people have just given up their jobs and gone to gold mining. Ever seen a flock of chickens running around? One runs after a fly and pretty soon the whole flock runs after it. That's what's happened with gold mining."

They are known variously as flatlanders, "new argonauts" and "oromaniacs" and they are changing the face of once-sleepy towns like Downieville and once-tranquil rivers like the American.

The evidence:

• The U.S. Bureau of Land Management, which grants the mineral rights to 20-acre mining claims, reports that new claims are being filed at a rate of 1500 a month — twice as many as last year. There are 71,300 mining claims on file in California.

• In the first six months of 1980 the state Department of Fish and Game issued 6397 regular $5 dredging permits, compared with 5,516 in all of 1979 and 3818 in all of 1978.

• This year, Fish and Game has issued 23 special $75 permits for "monster" dredges (those with suction hoses 10 or 12 inches in diameter) compared with nine the year before and only two in 1978.

• In 1978, there were only 10 operating gold mines in California, according to Charles Schultz, inspector for the U.S. Mine Safety and Health Administration. In 1979, there were 40; this year, there are at least 70 — "and I don't think it's over. I think it's just starting," Schultz said. "I anticipate that by this time next year that figure will double again. There's a tremendous amount of gold to be recovered yet."

Just last week, Homestake Mining Co. of San Francisco, the nation's largest gold producer, announced the discovery of a pay streak, containing more than a million ounces of gold, about 20 miles north of Lake Berryessa in Napa County.

Photo by Jerry Telfer

Prospector George Wick inside his mining supply store, The Lost Dutchman, at Jamestown

•

In Jamestown, the southern Mother Lode, executive-turned-prospector George Wick was putting on a gold-panning demonstration for a trio of fortune-hunters from Van Nuys recently. He sold them a $6 green plastic pan and sent them off in search of some "color."

"They're up here for two weeks," Wick, 66, said with a sly grin. "They're going to Jack Ass Creek." A sign inside his mining supply shop, The Lost Dutchman, reads "Without gold, we fold."

Some 300 miles to the north, the solitude of the Trinity Alps has been violated daily by the whoosh of diesel-powered suction dredges lined up wall-to-wall in the Trinity River, all the way to the sea. What appears to be an army of frogmen use octopus-like tentacles from these dredges to suck up the gold-bearing gravel the '49ers couldn't reach.

To the east, a young prospector plumbed the paralyzing, 40-degree waters on the north fork of the Yuba River around Downieville recently and came up with a 3½-ounce nugget worth about $6000.

News like this quickly spreads to such gold country points as Whiskey Flat, Fairplay, the Indian Valley Outpost, the Golden Eagle Bar — and the fever gets a little more intense.

In a replay of yesteryear, old-timers throughout the gold country are strapping on six-guns to keep the newcomers from jumping their claims. And sheriff's departments have been piling up reports of stolen mining equipment while locals watch uneasily as behemoth investment firms begin multi-million-dollar excavations.

At supply shops, business is booming. "When the price of gold went from $250 an ounce to $800, people just went stark, raving berserk," said Steve Fisher, assistant manager of the Mother Lode Dive Shop in Sacramento. "We're the largest store in the world for portable mining equipment and until mid-July we had no dredges to sell since last October."

Downieville, with a population of 3000 and a severe housing shortage, recoiled under the impact of an estimated 50,000 fortune-hunters who swarmed into Sierra County this summer.

For every strike, according to Sierra County Welfare Director Connie Bennett, there are dozens of flatlanders whose dreams have soured. "There has been a 33 percent increase over last year in the number of people on welfare," Bennett said. "We are getting 10 to 15 applicants a week that are running out of money in the camps."

The story is the same throughout the Mother Lode. Neighboring Nevada County, for example, reported a 100 percent increase in the number of welfare applications since June 1979.

"An added caseload this year has been children living in shacks and tents on mining claims with no toilet facilities or running water," Bennett said. "They take their baths in the streams. We don't want kids to suffer because their parents are following this dream of making it on the mining claim.

"We just had a case a week ago of three deaf mutes, with three children, who came here believing the great dream and showed me a tiny little bottle with some flakes in it. They were using a pan. They were astounded when I told them they needed a claim and some expensive equipment.

"The adults had quit their jobs as pressmen in Pennsylvania and traveled day and night to get out here to find gold. They had been out here for three weeks and they were down to no food, no money, no job and no place to get a job. They had been sleeping in a car, six people in a regular passenger car.

"It amazes me that they don't find out anything before they come," Bennett said. "They're giving up their jobs, they're giving up everything to follow this gold rush. Most of them allude to the fact they read an article back East regarding gold mining. It's a nice day in the sun, for people, but it's not the riches they expect."

And every other day, the dream is rekindled. "I had a jubilant young man walk into my office one day who wanted to give away a lot of roast beef from a party he had the night before," Bennett said. "He had dug just one foot deeper in the river than the previous owner of the claim. He showed me his nuggets. He had some beautiful stuff."

•

California's ancient gravel beds contain the largest remaining gold deposits in the United States, according to the U.S. Bureau of Mines.

"Ninety percent of the gold is still there," said Norm Brown, a Sacramento engineer who makes $400 a day as a mining consultant.

GEORGE MASSIE
'100,000 people prospecting'

"Getting it out economically is another question. Very small amounts are accessible to the little guy. Most prospecting you'll find is not done with a gold pan but a 4-wheel-drive pickup, a briefcase and a three-piece suit."

There are 25,000 gold districts in California and perhaps 70 operating gold mines, but who is actually taking out the gold remains a closely guarded secret.

Records kept by the U.S. Bureau of Mines are as deceptive as they are incomplete. 22 California mines reported a total of 3165 ounces last year — less than half the 7400 ounces reported in 1978.

Based on these statistics, California ranks a pitiful 11th in the nation in gold production. Dave Lockard, a gold specialist for the government, commented: "My gut hunch is, something's haywire."

One the one hand, the large Canadian-based Troy Gold Industries Ltd., which operates the Blazing Star Mine in West Point, Calaveras County, has had trouble meeting expenses. Troy Gold, which began selling at $2 a share in 1979 and spiraled to a giddy $14, has fallen back to $5 a share.

On the other hand, Dickey Exploration Co., a 10-man operation in Alleghany, Sierra County, turned the old Oriental Mine into the second largest gold producer in the United States in 1978 and 1979.

Don Dickey, who has been mining since 1930, said he was No. 1 in California, but thinks he has fallen behind Yuba Consolidated, which runs a bucket-line dredge operation near Marysville.

And some experts say the largest gold producer in California during the Gold Rush of 1980 is — not a gold mining enterprise — but A. Teichert & Son, a giant Sacramento construction firm that processes gold through its sand and gravel operation.

Teichert's general manager Armor Harris called gold recovery "unimportant ... like any byproduct, it's the bristles off the pig."

As Dickey put it: "You have to distinguish between mines that are mining gold and mines that are mining stockholders."

Tomorrow: Crooks and thieves in the gold fields

APPENDIX F

WESTERN MINING IN THE TWENTIETH CENTURY ORAL HISTORY SERIES

PREFACE--Western Mining in the Twentieth Century

The oral history series on Western Mining in the Twentieth Century documents the lives of leaders in mining, metallurgy, geology, education in the earth and materials sciences, mining law, and the pertinent government bodies. The field includes metal, non-metal, and industrial minerals. In its tenth year the series numbers thirty-five volumes completed and others in process.

Mining has changed greatly in this century: in the technology and technical education; in the organization of corporations; in the perception of the national strategic importance of minerals; in the labor movement; and in consideration of health and environmental effects of mining.

The idea of an oral history series to document these developments in twentieth century mining had been on the drawing board of the Regional Oral History Office for more than twenty years. The project finally got underway on January 25, 1986, when Mrs. Willa Baum, Mr. and Mrs. Philip Bradley, Professor and Mrs. Douglas Fuerstenau, Mr. and Mrs. Clifford Heimbucher, Mrs. Donald McLaughlin, and Mr. and Mrs. Langan Swent met at the Swent home to plan the project, and Professor Fuerstenau agreed to serve as Principal Investigator.

An advisory committee was selected which included representatives from the materials science and mineral engineering faculty and a professor of history of science at the University of California at Berkeley; a professor emeritus of history from the California Institute of Technology; and executives of mining companies. Langan Swent delighted in referring to himself as "technical advisor" to the series. He abetted the project from the beginning, directly with his wise counsel and store of information, and indirectly by his patience as the oral histories took more and more of his wife's time and attention. He completed the review of his own oral history transcript when he was in the hospital just before his death in 1992. As some of the original advisors have died, others have been added to help in selecting interviewees, suggesting research topics, and securing funds.

The project was presented to the San Francisco section of the American Institute of Mining, Metallurgical, and Petroleum Engineers (AIME) on "Old-timers Night," March 10, 1986, when Philip Read Bradley, Jr., was the speaker. This section and the Southern California section of AIME provided initial funding and organizational sponsorship.

The Northern and Southern California sections of the Woman's Auxiliary to the AIME (WAAIME), the California Mining Association, and the Mining and Metallurgical Society of America (MMSA) were early supporters. Later the National Mining Association became a sponsor. The

project was significantly advanced by a generous bequest received in November 1997 upon the death of J. Ward Downey, UC Berkeley alumnus and early member of the mining series advisory committee. His own oral history was completed in 1992. Other individual and corporate donors are listed in the volumes. Sponsors to date include nineteen corporations, four foundations, and 113 individuals. The project is ongoing, and funds continue to be sought.

The first five interviewees were all born in 1904 or earlier. Horace Albright, mining lawyer and president of United States Potash Company, was ninety-six years old when interviewed. Although brief, this interview adds another dimension to a man known primarily as a conservationist.

James Boyd was director of the industry division of the military government of Germany after World War II, director of the U.S. Bureau of Mines, dean of the Colorado School of Mines, vice president of Kennecott Copper Corporation, president of Copper Range, and executive director of the National Commission on Materials Policy. He had reviewed the transcript of his lengthy oral history just before his death in November, 1987. In 1990, he was inducted into the National Mining Hall of Fame, Leadville, Colorado.

Philip Bradley, Jr., mining engineer, was a member of the California Mining Board for thirty-two years, most of them as chairman. He also founded the parent organization of the California Mining Association, as well as the Western Governors Mining Advisory Council. His uncle, Frederick Worthen Bradley, who figures in the oral history, was in the first group inducted into the National Mining Hall of Fame in 1988.

Frank McQuiston, metallurgist for the Raw Materials Division of the Atomic Energy Commission and vice president of Newmont Mining Corporation, died before his oral history was complete; thirteen hours of taped interviews with him were supplemented by three hours with his friend and associate, Robert Shoemaker.

Gordon Oakeshott, geologist, was president of the National Association of Geology Teachers and chief of the California Division of Mines and Geology.

These oral histories establish the framework for the series; subsequent oral histories amplify the basic themes. After over thirty individual biographical oral histories were completed, a community oral history was undertaken, documenting the development of the McLaughlin gold mine in the Napa, Yolo, and Lake Counties of California (the historic Knoxville mercury mining district), and the resulting changes in the surrounding communities. This comprises forty-three interviews.

Future researchers will turn to these oral histories to learn how decisions were made which led to changes in mining engineering education,

corporate structures, and technology, as well as public policy regarding minerals. In addition, the interviews stimulate the deposit, by interviewees and others, of a number of documents, photographs, memoirs, and other materials related to twentieth century mining in the West. This collection is being added to The Bancroft Library's extensive holdings. A list of completed and in process interviews for the mining series appears at the end of this volume.

The Regional Oral History Office is under the direction of Willa Baum, division head, and under the administrative direction of The Bancroft Library.

Interviews were conducted by Malca Chall and Eleanor Swent.

Willa K. Baum, Division Head
Regional Oral History Office

Eleanor Swent, Project Director
Western Mining in the Twentieth
Century Series

January 1998
Regional Oral History Office
University of California, Berkeley

The Regional Oral History Office
would like to express its thanks to the organizations
and individuals whose encouragement and support have made possible
The Western Mining in the Twentieth Century Series.

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Organizations

American Institute of Mining, Metallurgical, and Petroleum Engineers, San Francisco, Southern California, and Black Hills Sections
Woman's Auxiliary to the AIME, Southern California and Northern California Sections
California Mining Association
The Jackling Fund of the Mining and Metallurgical Society of America
National Mining Association
South Dakota School of Mines and Technology

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